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Exploring knowledge and beliefs of Human Papillomavirus (HPV) infection and HPV vaccination among U.S. Chinese international students

Haijuan Gao
Purdue University

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Is approved by the final examining committee:

Dr. Gerald C. Hyner
Chair

Dr. Titilayo A. Okoror

Dr. Mohan Dutta

Dr. Thomas J. Templin

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EXPLORING KNOWLEDGE AND BELIEFS OF HUMAN PAPILLOMAVIRUS (HPV) INFECTION AND HPV VACCINATION AMONG U.S. CHINESE INTERNATIONAL STUDENTS

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Haijuan Gao

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To all Chinese International Students in the U.S.

who participated in my research.

Too all my friends and colleagues who supported me

during my studies at Purdue.

To my parents Juntang Gao and Guiying Li in China.

To Yui-Hong Tan.

爱你们!

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此时此刻，思绪万千。心中此起彼伏，满怀感恩。

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LIST OF ABBREVIATIONS

HPV	Human Papillomavirus
CIS	Chinese International Students
STI	Sexually Transmitted Infection
STD	Sexually Transmitted Diseases
IIE	Institute of International Education
LEEP	Electrosurgical Excision Procedure
CIN	Cervical Intraepithelial Neoplasia
CDC	Center for Disease Control and Prevention
HBM	Health Belief Model
TPB	Theory of Planned Behavior
ACIP	Advisory Committee on Immunization Practice

ABSTRACT

Haijuan Gao. Ph.D., Purdue University, May, 2015. Exploring knowledge and beliefs about HPV and HPV vaccination among U.S. Chinese international students. Major Professors: Titilayo A. Okoror and Gerald C. Hyner.

The Human Papillomavirus (HPV) vaccine provides an effective prevention strategy against HPV infection, cervical cancer, and genital warts. As increasing numbers of Chinese international students (CIS) are living and studying in United States, this specific ethnic group has become the candidate for HPV vaccination promotion. Despite an increased awareness and knowledge of HPV infection and HPV vaccine among U.S. college students, studies focused on CIS as a unique ethnic group regarding HPV vaccine promotion were limited. This project is the first time aimed to examine CIS's awareness, knowledge and beliefs about HPV infection, HPV vaccine, cervical cancer and genital warts. During the summer and fall of 2013, CIS attending a Midwestern university in the United States were recruited to take part in two studies: one quantitative study (employing online anonymous survey) and one qualitative study (employing focus group discussions). A total of 751 students participated in the survey. Surveys from 350 participants aged 18-26 years (mean=21.42) who had not been vaccinated for HPV were included in the data analysis. Ten focus groups were conducted with 44 CIS aged 18-34 (mean=24.6). The discussions were audio taped, transcribed and analyzed. The results demonstrated six major findings: (1) There was limited awareness, knowledge and

intentions about HPV vaccine among CIS. Only 27.2% of the 350 participants had ever heard of the HPV vaccine. Most participants were unaware of the cause of cervical cancer, and considered genital warts as “secret” “dirty” diseases. (2) There were sex differences with regard to CIS’s intentions and beliefs of HPV infection and HPV vaccine. Female CIS 69.2% were more likely than male CIS (34.9%) to receive an HPV vaccine in the future. Significantly, more female than male participants thought that HPV infection would influence their romantic relationship and that their family and partners would support their decision to receive an HPV vaccination. The only significant predictor of CIS’ vaccination intention was the vaccination behavior of best friends, particularly among female subjects. (3) There was evidence of a significant lack of formal sex education and formal information sources for all CIS. Parents and friends were not considered appropriate sources to seek support and information. Sources for information were informal: street advertisements and social websites such as “Renren.” (4) There were more open attitudes toward sexual behavior compared to Chinese women who were subjects of earlier surveys. Premarital sexual behaviors and multiple sexual relationships were acceptable in this cohort of CIS. (5) Sexual cultures and behaviors were perceived different between CIS born in the 1990s versus the 1980s. (6) CIS’ perceived stigma about HPV infection varied by knowledge level during the discussion. This study describes current perceptions of STI and HPV vaccination among CIS and identifies current perceptions of young Chinese adults who live abroad, especially with

respect to their values concerning vaccination behavior, STIs prevention, relationships and cultural identity.

CHAPTER 1. INTRODUCTION

1.1 Introduction

Human Papillomavirus (HPV) is a double-stranded DNA viruse that infects squamous epithelia inducing proliferative lesions (Stanley, 2010). Low-risk types of HPV (e.g., HPV 6 and 11) results in mild cervical abnormalities and genital and respiratory tract warts. High-risk types (e.g., HPV 16, 18, 31, 33, 35, and 45) are associated with anogenital cancers and their precursor lesions (intraepithelial neoplasia). As one of the most common Sexually Transmitted Infections (STIs), HPV infection has been established as a cause of cervical, anal, oropharyngeal, and oral cancers as well as various other types of disease such as genital warts (Harper & Paavonen, 2008). The primary route of genital HPV infection is sexual intercourse, both vaginal and anal. However, HPV transmission occurs via skin-to-skin contact and penetration of the vagina or anus is not essential (Stanley, 2010).

In 2014, there were two types of prophylactic HPV vaccines: the quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) and the bivalent vaccine Cervarix® (GlaxoSmithKline, Belgium) (Morbidity and Mortality Weekly Report, 2007). The quadrivalent vaccine-Gardasil targets approximately 70% of cervical cancers and 90% of genital warts (Centers for

Disease Control and Prevention, 2011d). Since 2006, the vaccine GARDASIL® has been licensed for females aged 9–26. On September 9, 2009, the U.S. Food and Drug Administration's Vaccines and Related Biological Advisory Committee recommended that GARDASIL® be licensed for males aged 9–26 for the prevention of genital warts (HPV types 6 and 11). Though the pharmaceutical companies mentioned above are conducting clinical trials in China, HPV vaccines are not available as they have yet to be approved by the Chinese State Food and Drug Administration (mainland China) (Cancer Foundation of China, 2014).

The People's Republic of China account for 14% of the world's annual incidence of cervical cancer, and the number of HPV infections among young Chinese women is rising (Hu et al., 2011). Each year, 30,000 deaths are reported from approximately 100,000 cases of cervical cancer (Parkin et al, 2005). However, there has been a lack of access to screening tests for cervical cancer among young, unmarried women in China as in developing countries (Agosti & Goldie, 2007). Most of the cervical cancer screening tests in China are opportunistic, comprising visits to hospital gynecology departments (Li, et al., 2011). A national screening program does not exist, only selected population-based screening sites are available in every province of China. However, only married women aged 30-59 years are included in these programs (Gu, et al., 2010). Since younger, unmarried Chinese women were perceived as not engaging in sexual behaviors prior to marriage, they are often omitted from the process, resulting in a lack of access to screening tests for cervical cancer among this population (Agosti & Goldie, 2007). There is a call for vaccination among the young women of China along with those of other developing countries (Agosti & Goldie, 2007).

In addition, there is limited research that examines Chinese women's knowledge and attitudes regarding HPV prevention and vaccination. A cross-sectional study conducted among 8,188 women of all age groups living in three major cities and rural areas of China suggested that 15.5% Chinese women had heard of HPV (Li et al., 2009). Among these, only 48.2% knew that HPV is related to cervical cancer, and 8.1% knew that it is associated with genital warts. Another population-based cervical cancer screening study indicated that only 39.6% of younger Chinese women had heard of HPV and 76.8% of them linked HPV with cervical cancer (Hu, et al., 2011). The factors influencing HPV awareness included medical history, education, occupation, smoking status, alcohol use, and hygiene behaviors during sexual intercourse (Li, et al., 2009). Younger women with higher levels of education and better income had greater knowledge about HPV (Gu, Chan, & Twinn, 2010). After being educated about the merits of the HPV vaccine, the majority of Chinese women (84.6%), still without access to it, were willing to receive the HPV vaccine due to their fear of HPV infection and genital warts (Li, et al., 2009).

Chinese women living where HPV vaccine is available—Hong Kong, Taiwan, and overseas in the United States and Canada—generally are more aware and have a higher level of knowledge of HPV and HPV vaccine than women of the mainland. Similar to mainland Chinese women, they are more likely to accept HPV vaccination (Kwan et al., 2009; Lee et al., 2007; Nguyen, Chen, & Chan, 2012). However, Chinese culture played a critical role in how women interpreted the vaccination. For example, Chinese women living in Hong Kong stigmatize

HPV infection as a type of Sexually Transmitted Infection (STI) (Kwan, et al., 2009). Chinese women living in United States were reluctant to be vaccinated against a type of STI, insisting that they had not engaged in unsafe sex and were not having sex with anyone other than their trusted partner (Lee, et al., 2007).

Along with globalization, the growth of the knowledge-based economy has led to an increased demand for higher education (Kritz, 2006). For decades, increasing numbers of students have migrated to the United States to pursue degrees in higher education. These international students constitute an important cohort in U.S. colleges and universities (Kritz, 2006). According to data collected by the Institute of International Education (IIE), the number of international students in the United States has increased from 547,867 in the 2000–2001 academic year to 764,485 in the 2011–2012 academic year, meaning that 3.7% of the total students enrolled in United States institutions of higher education are from countries outside of the United States (Institute of International Education, 2012b). Since the 2008-2009 academic year China has been the number one country of origin for these international students. In the 2012–2013 academic year, 235,597 Chinese international students (henceforth as CIS) were studying in the United States, accounting for 28.7% of the total number of international students, up from 21.4% the previous year (Institute of International Education, 2013c).

International students are not immigrants; they are visitors who are living in a foreign country in order to pursue educational goals (Wei et al., 2007). While they come with their own cultural backgrounds, they also experience acculturation while studying in the United States (Ye, 2006a). Acculturation is defined as the amount of culture-related values, beliefs, affects, customs, and behaviors that are norms of the majority/host culture

that are adapted or endorsed by a minority/immigrant individual (Ward, 1996). Previous researchers had consistently indicated that Asian (including Chinese) international students experience more stress related to acculturation than European international students because their backgrounds differ more from Americans than their European counterparts (Sumer, 2009). According to Wang and Mallinckrodt (2006), most CIS are likely to encounter considerable acculturative stress because of the differences in academic and social norms between Chinese and U.S. culture. Many common types of acculturation-related stress that CIS face when coming to study in the United States include academic concerns, language difficulties, lack of social support, poor social integration, difficulties in adjusting to new foods or cultural values, perceived discrimination, homesickness, and psychology syndromes such as depression (Wang & Mallinckrodt, 2006; Wei, et al., 2007; Yeh & Inose, 2003). This huge subset of ethnic minority students has become an important target group for health interventions (Tung, Lu,& Cook, 2012).

According to Tung and colleagues (2013), as Chinese students move to the United States, they may become susceptible to adopting not only the cultural expressions of the host country such as food choices but also the health behaviors of the host country, such as sexual behaviors, which might put them at risk for STIs. According to a review by Meston and Ahrold (2010), Asian undergraduates at Western universities were more sexually conservative than non-Asian students; however, more acculturated individuals tended to adopt sexual practices similar to those of the mainstream culture. Asian immigrants in Canada indicated that long-

term residents had more “Western” or “liberal” sexual attitudes than residents who recently immigrated. Furthermore, the effects of acculturation were more significant with respect to the casual sexual behavior in Asian women than Asian men (Meston & Ahrold, 2008; Meston, Trapnell, & Corzalka, 1998; Meston, Trapnell, & Gorzalka, 1996).

Aside from acculturation, contemporary Chinese culture also influences the sexual behavior of CIS. Chinese society has undergone rapid change since 1979 and young people in China are exhibiting more liberal attitudes toward sexual behavior than was common in previous generations (Higgins & Sun, 2007). As has been suggested in numerous studies, premarital sex has become more widely accepted among the youth in China. A nationwide survey of 20,000 men and women in China showed that 66% of the college student respondents experienced their first sexual intercourse between the ages of 17 and 22 (Liu, Ng, Zhou, & Haeberle, 1997). According to a survey administered in multiple sites in China, more than 10% of 15 to19 years old females who lived in urban areas were sexually active (Zhao, Hu, Zhang, Chen, & Qiao, 2010). As such, young Chinese should be the focus of public health education and intervention efforts to prevent sexually transmitted infections (STI), specifically Human Papillomavirus (HPV), because of its link to cervical cancer, and the merits of HPV vaccination (Zhao, et al., 2010).

In conclusion, although these studies have been conducted among Chinese women worldwide and among US college students, there is limited research available regarding Chinese adults of both sexes, especially those young Chinese adults living overseas. Living and studying in the United States as international students, influenced by contemporary sexual culture from both China and United States, CIS has become an important focus group for public health education and intervention efforts to prevent

sexually transmitted infections (STI), specifically Human Papillomavirus (HPV), and to prevent the diseases related to the infection. From a public health perspective, there is a need to determine CIS' degree of knowledge about HPV infection and vaccination, as well as whether or not they intend to receive the HPV vaccination. Furthermore, the literature revealed no studies that have explored HPV infection and HPV vaccination among CIS in the United States.

1.2 Purpose and Hypothesis

The purpose of this study is to explore CIS' knowledge and beliefs with respect to HPV and HPV vaccination.

The specific research questions are:

(1) What is the awareness and knowledge level of CIS regarding HPV vaccine and related diseases?

(2) How likely is it that CIS will receive the HPV vaccine?

(3) What influence CIS' intention to receive the HPV vaccination?

(4) What do CIS believe about HPV infection and HPV vaccination?

(5) How do contemporary Chinese culture and living and studying in US influence CIS's awareness, knowledge, and beliefs of HPV infection and HPV vaccination?

The hypothesis of the study:

1. The level of awareness and knowledge of HPV infection and HPV vaccination is low among CIS compared to United States college students.

2. There are sex differences regarding CIS' knowledge level and intention of receiving HPV vaccine.

3. Most CIS are likely to receive the HPV vaccine in the future.

4. CIS' intention to receive the HPV vaccination are influenced by their living and studying experiences in the United States, their sexual experience, and their beliefs with respect to HPV infection and HPV vaccination.

CHAPTER 2. LITERATURE REVIEW

2.1 Chinese International Students and Cultural Influence on Sexual Behavior

Along with globalization, the growth of the knowledge-based economy has led to an increased demand for higher education (Kritz, 2006). Thus, international education has become vital to strengthening economies and societies around the world (Institute of International Education, 2012a). For decades, increasing numbers of students have migrated to the United States to pursue degrees in higher education. Those international students constitute an important cohort in U.S. colleges and universities (Kritz, 2006). In 2011, international students contributed over $22.7 billion to the U.S. economy. According to the Institute of International Education (IIE) (2012a), 64% of international students (82% of undergraduates) rely primarily on personal and family funds to pay for their studies in the United States.

According to the data collected by the IIE (2012b) the number of international students in the United States has increased from 547,867 in the 2000-2001 academic year, to a record high of 764,485 in the 2011–2012 academic year, a 6% increase. The same year, international students account for 3.7% of the total students enrolled in U.S. institutions of higher education. The top three states, California, New York, and Texas, host 32% of

all international students. In the United States, 66% of all international students are hosted by 200 institutions with 1,000 or more enrolled (Institute of International Education, 2012a). Doctorate-granting universities account for 64% of international students, and women comprise 44% of all international students. (Institute of International Education, 2012a).

According to the IIE (2012c), 52.5% of international students in the United States come from four countries: China (25.4%), India (13.1%), South Korea (9.5%), and Saudi Arabia (4.5%). China has become the top country of origin for international students beginning with the 2008–2009 academic year. CIS students in the United States numbered 194,029 in the 2011-2012 academic year, which accounted for 25.4% of the total number of international students (up from 23.1% the previous year) (Institute of International Education, 2012c). While the majority of CIS in the United States are graduate students, there is a continuing upsurge in the number of undergraduates. In the 2011–2012 academic year, the total of CIS comprised 38.4% undergraduate students, 45.6% graduate students, 9.5% in optional practical training (OPT), and 6.5% in others. In the same year, 28.7% of CIS majored in business/management, followed by 19.6% in engineering, 11.2% in math/computer science, 9.9% in physical/life science, 7.7% in social science, and 22.9% in other areas (Institute of International Education, 2012b).

2.2 Acculturation of Chinese International Students.

International students are defined as non-immigrant, foreign students living in the United States on temporary visas studying at the postsecondary level (Institute of International Education, 2012a). Most international students plan to eventually return to

their home countries. While they have their own cultural backgrounds, they experience acculturation while studying in the United States. (Ye, 2006a).

The term acculturation was originally proposed by anthropologists to refer to group-level phenomena involving change that results from contact between two different cultures (Redfield, Linton, & Herskovits, 1936). More specifically, acculturation is defined as the amount of culture-related values, beliefs, affects, customs, and behaviors that are norms of the majority/host culture that are adapted or endorsed by a minority/immigrant individual (Ward, 1996). Previous researchers had consistently indicated that Asian (including Chinese) international students experience more stress related to acculturation than European international students because their backgrounds differ more from Americans than their European counterparts (Sumer, 2009).

According to Wang and Mallinckrodt (2006), most CIS are likely to encounter considerable acculturative stress because of the differences in academic and social norms between Chinese and U.S. culture. Inherent in Chinese culture, CIS generally hold beliefs about the virtues of humbleness, emotional restraint, self-effacement, and saving face. CIS are likely to have difficulties fitting in with an American style of social conversation, and are less likely to express their feelings, assert expressions of their own opinions, or share personal information (Wang & Mallinckrodt, 2006). Common types of acculturation-related stress that CIS face when coming to study in the United States include academic concerns, language difficulties, lack of social support, poor social integration, difficulties in adjusting to new foods or cultural values, perceived discrimination, homesickness,

and psychology syndromes such as depression (Wang & Mallinckrodt, 2006; Wei, et al., 2007; Yeh & Inose, 2003). CIS also reported using online ethnic social groups as one type of social support over traditional support of families and friends they acquire in the United States (Ye, 2006a, 2006b)

According to research within a mixed ethnicity environment by Okazaki (2002), Asians show more conservative rates of sexual behavior than any other ethnic group in the United States. A large, cross-sectional study conducted in Canada by Meston, Trapnell, and Gorzalka (1996) showed that among college students, Asian undergraduates were less likely to participate in oral sex, masturbation, petting, and intercourse compared with non-Asian peers (Meston, et al., 1996)(Meston, et al., 1996). Asian students in this group are more likely to report having their first experience with intercourse at an older age with a lower frequency of intercourse overall. Asian female college students were less likely to report experiences with intercourse than their male counterparts (Meston, et al., 1996).

Several studies of Asian immigrants in Canada indicate that long-term residents tend to adopt sexual practices similar to those of the mainstream culture (Meston, et al., 1998). This research finding from this population indicated that long-term residents had more “Western” or “liberal” sexual attitudes than residents who recently immigrated. Furthermore, the degree of influence of sexual behavior differed according to gender. Longer-term resident Asian-American women were more likely to engage in sexual behaviors; however, Asian-American men seemed to be less affected by the term of residence (Meston, et al., 1998). Meston and Ahrold’s (2010) research among 1, 419 U.S. undergraduate students suggested that heritage acculturation in Asian women predicted

that initial experiences of sexual activity and of first intercourse occurred at a significantly older age. Although there were no significant effects of acculturation on the range of sexual experiences among Asian men, these effects were significant with respect to casual sexual behavior of Asian women (Meston & Ahrold, 2008).

2.3 Contemporary Chinese Culture's Influence on Sexual Behavior.

China has experienced dramatic social changes associated with rapid economic growth and reform since 1979. Traditional Confucian cultural values outlined a code of appropriate behavior that implied sexual conduct was admissible only under the covenant of marriage for the purpose of procreation. Sexual activities beyond reproduction were viewed as undignified and disrespectful. However, with the opening of the country to the outside world, policies promoting economic freedom that not only permit but encourage people to make decisions related to pursuing their individual aspirations have been adopted (Evans, 1997). Since the reforms of the 1970s, traditional attitudes related to sex, marriage, and family have become more liberal (Guan, 2004).

Young people in China are exhibiting more liberal attitudes toward sexual behavior than was common in previous generations (Higgins & Sun, 2007). As suggested in numerous studies, premarital sex has become more widely accepted among Chinese youth. Pan (1995) reported that the percentage of Beijing's urban population that approved of premarital sex rose from 50% in 1986 to 70% in 1990. Among a group of college students, 40% showed their approval of premarital sex as long as they were in love, and 35% approved if both sides agreed (Pan, 1995).

Another nationwide survey of 20,000 men and women in China showed that 66% of the 372 college student respondents experienced their first sexual intercourse between the ages of 17 and 22. In contrast, more than 60% of the less educated married couples surveyed engaged in their first sexual intercourse on their wedding day. Overall, the younger and more highly educated the couples, the more likely they were to practice premarital sex (Liu, et al., 1997). According to the 2004 research of Qian, Tang, and Garner, who conducted seven studies in urban areas, the majority of unmarried women had experienced sexual intercourse; in five of these studies, the rate of premarital sex ranged from 54% to 82%. According to a survey administered at multiple sites in China, more than 10% of 15–19-year-old females who lived in urban areas were sexually active (Zhao, et al., 2010).

As seen from the foregoing, the opening and reform of China in the 1970s has led to profound changes in sexual behavior. Premarital sex has become more widely accepted among Chinese young people, and they have generally become more tolerant toward extramarital sex. Predominantly affecting the younger population, STI has become an important public health problem in China (Cohen, Henderson, Pat, & Zheng, 1996). As such, young Chinese should be the focus of public health education and intervention efforts to prevent sexually transmitted infections (STI), specifically Human Papillomavirus (HPV), because of its link to cervical cancer, and the merits of HPV vaccination (Zhao, et al., 2010). Thus, in order to prevent cervical cancer and other diseases, Chinese girls between 13 and 15 years of age should become the focus of STI prevention and HPV vaccination (Zhao, et al., 2010).

2.4 Human Papillomavirus (HPV)

The Papillomavirus comprises double-stranded DNA viruses that infect squamous epithelia inducing proliferative lesions (Stanley, 2010). They are species-specific, thus, HPV only infects humans. Differentiated by genotype, there are approximately 130 subtypes of HPV that have been identified, and approximately 30 types that infect the genital system. The genital type of HPV can be separated into low- or high-risk types, depending upon their oncogenic potential (Stanley, 2010). Low-risk HPV types (e.g., HPV 6 and 11) can result in mild cervical abnormalities, and genital and respiratory tract warts. High-risk HPV types (e.g., HPV 16, 18, 31, 33, 35, and 45) are associated with anogenital cancers and their precursor lesions (intraepithelial neoplasia), particularly of the cervix. Most, 99.7%, of cervical cancers show HPV DNA sequences from a high-risk oncogenic genital HPV. The most prevalent types are HPV 16, found in 55–70%, and HPV 18, found in 7–20%, of cervical cancer cases (Beutner, Reitano, Richwald, Dorothy, & Panel, 1998). As a result of the human immune response, HPV infection does not necessarily lead to disease. Studies show that 70–90% of HPV infection will either resolve itself or become undetectable without intervention within 36 months of infection (Frazer et al., 2006). If recurrent infection occurs, it can cause several different diseases in those affected.

Low-risk types of HPV cause anogenital condyloma, commonly referred to as genital or anal warts (Ault, 2006; Beutner, et al., 1998). Rarely, these low-risk HPVs can also cause recurrent respiratory papillomatosis (warts) of the throat that can block the airways, causing a hoarse voice or difficulty in breathing

(Centers for Disease Control and Prevention, 2011b). During pregnancy, anogenital condyloma may proliferate and become friable (Association of Reproductive Health Professionals, 2009). A pregnant woman with genital HPV who does not receive treatment with antivirals can transmit HPV to her baby during vaginal delivery, and, in these cases, the child can develop juvenile-onset recurrent respiratory papillomatosis (RRP). Approximately 2,000 children develop RRP every year in the United States (Centers for Disease Control and Prevention, 2011b).

High-risk HPV infection is strongly associated with cervical (99.7%), vulvar (50%), vaginal (65%), penile (35%), anal (90%), head, and neck (oropharyngeal) 60% cancers (Stanley, 2010). Up to 99.7% of cervical cancers are attributed to high-risk HPV (Stanley, 2010). Anal cancer (90%), vaginal cancer (65%), penile cancer (35%), vulvar cancer (50%), and oropharyngeal cancer (60%) are also attributed to high-risk HPV (Centers for Disease Control and Prevention, 2011a). Human Papillomavirus induced cancers could affect both sexes. Men could be diagnosed with HPV-related penile cancer and HPV-related anal cancer (Centers for Disease Control and Prevention, 2011c). Men who have sex with men (MSM) are 17 times more likely to develop HPV-related anal cancer than men who only have sex with women (Centers for Disease Control and Prevention, 2011c). Women are also more likely to experience negative outcomes from HPV infection than heterosexual men. High-risk HPV infection follows the same pattern as low-risk HPV infection, but the time to clearance is 12 to 18 months (Stanley, 2010). Approximately 10–15% of women do not have a successful immune response to HPV and remain HPV DNA-positive with persistent viral infection. The risk factors for persistent HPV infection and/or neoplastic progression include smoking, HPV type,

increasing age, lack of condom use, immunodeficiency, other STIs, and oral contraceptive use (Association of Reproductive Health Professionals, 2009).

Women with persistent HPV infection are at higher risk for different degrees of precancerous development known as cervical intraepithelial neoplasia (CIN). There are three stages of CIN: CIN-1, CIN-2, and CIN-3. CIN-3 is a much higher degree of cancerous change with a higher incidence of cervical cancer. The estimated time from the detection of high-risk HPV to the development of CIN-3 is 3 to 15 years; and when HPV infection occurs in the late teens or early twenties, CIN-3 diagnosis peaks around 25–30 years of age (Moscicki, 2005; Schiffman & Castle, 2003; Stanley, 2010). The progression to invasive cancer may take another 10–20 years with approximately 30– 40% of CIN-3 dysplasia actually progressing to invasive cervical cancer (Herrero et al., 2000; Stanley, 2010). However, a prospective, intensive follow-up study documented a more rapid development of CIN-2 and -3, sometimes within a few months after initial infection. The study noted that CIN-3 lesions tended not to regress over a short-term period and an observational follow-up of these lesions would be unethical (Winer et al., 2006).

2.5 HPV Transmission, Treatment and Screening Test

The primary route of genital HPV infection is sexual intercourse, both vaginal and anal. Human Papillomavirus transmission occurs via skin-to-skin contact and penetration of the vagina or anus is not essential (Stanley, 2010). The regular and consistent use of condoms offers 60% protection against HPV infection; however, HPV can still be transmitted through contact with unprotected genital skin areas such as the vulva or scrotal region (Winer et al., 2006). The

source of HPV transmission is usually asymptomatic, that is HPV-infected persons who do not realize they are infected. Therefore, the only absolute way to prevent HPV infection is to refrain from genital contact with another individual (Centers for Disease Control and Prevention, 2004). Similar to other STIs, the risk factors for acquiring genital HPV infection are predominantly related to sexual behaviors. These factors include being young, having experienced sexual intercourse at an early age, having unprotected sex (lack of condom use), having multiple sexual partners, acquiring new sexual partners, and having partners who have multiple sexual partners or have a history of HPV infection (Centers of Disease Control and Prevention, 2007; Stanley, 2010).

There is no cure for HPV, however, symptoms of genital warts and cervical dysplasia can be managed successfully through various forms of treatment (Boardman & Boardman, 2000; Lacey, 2005). The main treatment is surgical removal through the use of liquid nitrogen to freeze visible genital warts and cervical lesion tissues (Boardman, & Boardman, 2000). Other procedures to remove visible cervical lesions include loop electrosurgical excision procedure (LEEP), cold knife conization, and laser surgery (Boardman, & Boardman, 2000; Lacey, 2005). For cervical cancer, the range of surgery depends on the stage of the disease. At the very early stage of CIN-3, local excision might be an effective method; however, the later stages might require more invasive and wider region surgeries, possibly with the additional use of chemotherapy and/or radiotherapy. Several topical agents can be used to treat genital warts including podophyllino, 5-fluorouracil, cidofovir, and trichloracetic. All forms of treatment are designed to promote immune system response to current HPV infections (Schlecht et al.,

2001). Though these treatment options exist, screening for HPV is an effective preventive measure.

Cervical cytology screening is a highly effective secondary prevention measure for cervical cancer. There are three methods of screening for HPV infection to enable earlier diagnosis. The Pap smear test (conventional cytology), the liquid-based monolayer cytology test (originated in the mid-1990s), and the HPV DNA test (World Health Organization, 2007). A cytology test could detect signs of HPV-infected cells; while an HPV DNA test could reveal the infection and subtypes of HPV virus. The diagnosis of cervical cancer or pre-cancer requires a biopsy of the cervix through colposcopy. Further diagnosis procedures include LEEP and conization, in which the inner lining of the cervix is removed and examined pathologically. Since cervical cancer is a progressive disease, these two pathology tests can be used to diagnose the degrees of CIN and prevent the development of cervical cancer (World Health Organization, 2007). Still, there is a need for early screening of cervical cancer. In addition, with no cure for HPV, developing a vaccine can provide preventive steps in reducing cervical cancers.

2.6 HPV Vaccine

In 2008, the Nobel Prize for Medicine was awarded to three virologists. One of them, the German scientist Harald zur Hausen, had successfully detected and isolated HPV types 16 and 18 DNA from cervical cancer (Stanley, 2010). Harald zur Hausen discovered the link between HPV and cervical cancer in the 1970s (Tsunokawa et al., 1986; zur Hausen, 1977, 2002); however, that discovery was dismissed by the scientific community because many scientists reported

finding that cervical cancer was linked to the genital herpes virus, having sexual intercourse with uncircumcised men, and a host of other factors (McIntyre, 2005). In the 1980s, zur Hausen and colleagues linked specific types of HPV to cervical cancer and genital warts, at which time the scientific community began to take notice (Tsunokawa et al., 1986). At the start of the 1990s, epidemiologists and other researchers confirmed that HPV was indeed a causal agent in the development of cervical cancer (McIntyre, 2005). In 1984, zur Hausen approached pharmaceutical companies to begin work on an HPV vaccine, but his proposal was rejected as the pharmaceutical industry believed developing an HPV vaccine was low on the hierarchy of importance and, thus, would not be a profitable investment (McIntyre, 2005). Twenty-two years later, in 2006, the U. S. Food and Drug Administration (FDA) licensed the first HPV vaccine (GARDASIL®) in the United States. Research that began in the 1980s by scientists at Georgetown University Medical Center, the University of Rochester, the University of Queensland in Australia, and the National Cancer Institute led to the development of this first HPV vaccine (McNeil, 2006).

Currently, there are two types of prophylactic HPV vaccines on the U.S. market: the quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) and the bivalent vaccine Cervarix® (GlaxoSmithKline, Belgium) (Morbidity and Mortality Weekly Report, 2007). In 2006, the vaccine GARDASIL® was licensed for females aged 9–26. The Advisory Committee on Immunization Practice (ACIP) recommends routine vaccination for girls aged 11–12 years, early vaccination for girls as young as 9, and “catch-up” vaccination (vaccinating those who did not get vaccinated at young age) for girls and young women 13–26 years (Morbidity and Mortality Weekly Report, 2007).

GARDASIL® protects against four types of HPV; two of which (16 and 18) are associated with cervical, vaginal, vulvar, penile, anal, and oral cancers and their precursors, and two (6 and 11) that cause anogenital warts (Morbidity and Mortality Weekly Report, 2007). On September 9, 2009, the U.S. FDA Vaccines and Related Biological Advisory Committee recommended that GARDASIL® be licensed for males aged 9–26 years of age for the prevention of genital warts (HPV types 6 and 11); and in 2010, the FDA approved the license. Currently, GARDASIL® is licensed and clinically available in over 80 countries. The second vaccine, CERVARIXTM is used for two oncogenic HPV types (16 and 18) (Keam & Harper, 2008). CERVARIXTM has been approved since 2009. The vaccine is currently licensed in Australia, the Philippines, and the European Union. Because both GARDASIL® and CERVARIXTM are preventive vaccines, they must be administered prior to exposure to HPV types 16, 18, 6, and 11. Therapeutic HPV vaccines, which are intended to treat preexisting conditions, are under investigation (Roden, Ling, & Wu, 2004). While HPV has been recognized as the most common viral STI in the United States, providing vaccination for it has become contentious.

2.7 HPV Vaccination in the U.S. Context

With 6.2 million new infections each year, Human Papillomavirus has been recognized as the most common viral STI in the United States (Vamos, McDermott, & Daley, 2008; Weinstock, Berman, & Gates, 2004). According to the National Health and Nutrition Examination Survey (NHANES) conducted in 2003–2004, the overall prevalence of HPV infection was approximately 26.8%

among females aged 14–59 years, as high as 24.5% among girls 4–19 years, and 44.8% among women aged 20–24 years (Dunne et al., 2007). It is estimated that over 80% of sexually active Americans will become infected with some type of HPV at some point during their lives (Koutsky, 1997; Myers, McCrory, Nanda, Bastian, & Matchar, 2000). Despite its prevalence, vaccination uptake has met with controversy.

Controversy over HPV vaccination began even before a vaccine was licensed. Opposition to an STI prevention vaccine and heavy lobbying of state legislations by Merck & Company Inc. led most states to give up their initiative toward promoting mandatory HPV vaccination. One of the biggest concerns regarding the introduction of an HPV vaccination was that availability of a vaccine against an STI would undermine abstinence-based prevention messages (Colgrove, 2006; Haber, Malow, & Zimet, 2007; Udesky, 2007; Vamos, et al., 2008). Furthermore, HPV is not transmitted through casual contact and mandatory legislation might violate parents' autonomy and families' religious rights. Opponents of HPV vaccination believed that the vaccine was comparatively new and that long-term safety data was needed. Also, there were concerns related to the price, access, and cost-effectiveness of the vaccine—three doses over a 6-month period would cost US$360. HPV vaccines cannot prevent other high-risk virus strains that lead to cervical cancer. Thus, HPV vaccination cannot substitute for screening tests and further booster shots might be needed. HPV vaccines only provide up to 5 years of protection (Colgrove, 2006; Haber, et al., 2007; Vamos, et al., 2008).

As a result of the above, the vaccination coverage of teenaged children remained low. According to the Center for Disease Control and Prevention's (2011d) National Immunization Survey, 53.0% of teenaged girls received at least one dose of HPV vaccine,

while only 34.8% received three doses. Also, HPV vaccination rates were lower among younger boys compared with older girls. Of the teenaged boys, 8.3% received at least one dose of HPV vaccine compared with only 1.0% who received three doses (Centers for Disease Control and Prevention, 2011d). In response to the previously high coverage rates of school entry mandatory vaccines such as Hepatitis B (96%) and Varicella (94%), and to increase the coverage of HPV vaccination among young teenagers, a call was made for mandatory HPV vaccination (D. Ferris, Horn, & Waller, 2010).

Furthermore, it's unclear what the HPV vaccine uptake is among college aged men and women, as there is no national survey yet to paint an accurate picture of the vaccine uptake among this population. However, studies conducted in 2007 indicate that only 12% of college-aged females have received at least one vaccine injection (Allen et al., 2009). A later study that collected data among 972 college women from 2007 to 2009 showed that 49% of the participants received at least one dose of an HPV vaccine (Roberts, Gerrand, & Gibbons, 2010). In November, 2010, a survey conducted at a large, public university in California showed that only 30% of women aged 18–26 had received at least one dose of an HPV vaccine (Centers for Disease Control and Prevention, 2011d). The above studies indicated some awareness among this population.

College students in the United States have a comparatively high level of knowledge about HPV vaccination. Female college students were more aware of HPV infection and HPV vaccines than their male counterparts (Sandfort & Pleasant, 2009), and knowledge affected people's accessibility to HPV vaccine in

some of the studies (D. G. Ferris, et al., 2009; Lenselink, et al., 2008). A study conducted among 1,975 female college students aged 18–23 years showed that 95% had heard about the HPV vaccine GARDASIL® (Bendik, et al., 2011). Among this group, only 30.4% knew that HPV was the most common STI on campus. Most knew that HPV infection can be asymptomatic and that HPV may cause cervical cancer; however, few knew of the potential consequences of HPV and its mode of transmission (Bendik, et al., 2011). According to Gerend and Barley (2009), 83% of 295 male college students had heard about HPV. The majority of them had learned about HPV from a health education class, television, or friends. However, only half had heard about HPV vaccination. Male college students were confused about the distinction between genital warts and genital herpes, and less than 25% were aware of the connection between HPV and anogenital cancers (Gerend & Barley, 2009). Another study conducted by Mehta and Sharma (2011) confirmed that 81.1% of their participants had heard of HPV.

Female college students tend to hold more positive attitudes overall toward the HPV vaccine than their male counterparts. The majority of college women are interested in GARDASIL®, and 85% to 88% of participants intend to get vaccinated (Gerend & Magloire, 2008; Jones & Cook, 2008; Kahn et al., 2003). However, college men reported moderate interest in the HPV vaccine and even after being informed of the benefit that male HPV vaccination reduces a woman's risk of cervical cancer, men showed no increased interest in the vaccine (Gerend & Barley, 2009). The different acceptability of HPV vaccination between female and male college students may be due to different decision- making processes and issues with respect to vaccinating boys and girls (Liddon, et al., 2010). For example, males are not subject to cervical cancer, and even though

various types of other diseases can be prevented by the vaccine, such as genital warts, anal, oropharyngeal, and oral cancers (Harper & Paavonen, 2008), males do not recognize HPV vaccines as being beneficial to them directly (Liddon, et al., 2010). Other studies revealed that even if male college students were aware that vaccination could help reduce the risk of cervical cancer for their female partners, their acceptability of HPV vaccines did not increase (Jones & Cook, 2008).

In addition, a comprehensive literature review examining university students' attitudes and intentions to receive HPV vaccinations using the Health Belief Model (HBM) and Theory of Planned Behavior (TPB) found that perceived susceptibility (Bennett, 2012; Gerend & Barley, 2009; Gerend & Shepherd, 2012; Marlow, Waller, Evans, & Wardle, 2009; Mehta & Sharma, 2011); perceived benefits (Bennett, 2012; Gerend & Barley, 2009; Marlow, et al., 2009); personal experience of STI infection, sexually active and multiple sexual partners (Gerend & Barley, 2009); perceived social norms (Bennett, 2012; Gerend & Barley, 2009); ethnicity, and religion (Marlow, et al., 2009) were all significantly correlated with the acceptability of the HPV vaccine.

2.8 HPV Vaccination among Chinese Women Worldwide

As one of the most common STIs, HPV has been established as a cause of cervical, anal, oropharyngeal, and oral cancers as well as various other types of disease such as genital warts (Harper & Paavonen, 2008). Cervical cancer is the second leading cancer among women worldwide, and over 85% of cervical cancers occur in developing countries (Ferlay et al., 2010). The People's Republic of China accounts for 14% of the world's annual incidence of cervical cancer (Hu,

et al., 2011). Each year, 30,000 deaths are reported from approximately 100,000 cases of cervical cancer (Parkin, Bray, Ferlay, & Pisani, 2005). According to Li, Kang, and Qiao (2011), the crude incidence rate of cervical cancer is 8.55 per 100,000 women. There also are two age-specific incidence peaks of cervical cancer: women 40-44 years of age and women 65 and older (Li, Kang, & Qiao, 2011).

Multiple investigations have demonstrated that the prevalence and incidence of HPV infection varies by age in China. However, these population-based screening studies are mainly focused on women older than 30 years (Hu, et al., 2011). There is a lack of research related to HPV infection among younger Chinese women. Still, increasing cervical cancer rates have been found among this population, which makes it an important focus group for cancer prevention strategies (Zhao, et al., 2010).

Selected population-based screening sites are available in every province of China; however, a national screening program does not exist. Most of the cervical cancer screening tests in China are opportunistic, comprising visits to hospital gynecology departments (Li, et al., 2011). The majority who are screened attend cervical screenings as part of an organized health examination program for women. Importantly, most of these women receive free screening services prompted by routine health examinations or through community health centers. However, only married women aged 30-59 years are included in these programs (Gu, et al., 2010). Since younger, unmarried Chinese women were perceived as not engaging in sexual behaviors prior to marriage, they are often omitted from the process, resulting in a lack of access to screening tests for cervical cancer among this population (Agosti & Goldie, 2007).

Facing the lack of access to screening tests, HPV vaccination is an important and effective primary cervical cancer supplementary prevention method. There is a call for vaccination among the young women of China along with those of other developing countries (Agosti & Goldie, 2007). However, in 2014, there were two types of prophylactic HPV vaccines on the market—the quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) and the bivalent vaccine Cervarix ® (GlaxoSmithKline, Belgium)—are available in the United States, Canada, Australia, and most of Europe (Harper & Paavonen, 2008). Both pharmaceutical companies are conducting clinical trials in China, but have not yet received the approval of the Chinese State Food and Drug Administration (mainland China) (Li, et al., 2009; China Cancer Foundation, 2014).

Since HPV vaccines were not licensed in mainland China, as of 2015, there are few studies related to Chinese women's knowledge and attitudes regarding HPV prevention and vaccination. A cross-sectional study conducted among 8,188 women of all age groups living in three major cities and rural areas of mainland China suggested that 15.5% of Chinese women had heard of HPV. Among these, only 48.2% knew that HPV is related to cervical cancer, and 8.1% were aware that it is associated with genital warts. Women's awareness differed among the rural and metropolitan areas. Only 18.6% of urban women knew that HPV is a STI compared to the higher rate (23.1%) of those in the rural areas; and even fewer women (8.1%) knew that HPV is associated with genital warts in both rural and urban areas. Aside from context, other factors influencing HPV awareness included medical history, education, occupation, smoking status,

alcohol use, and hygiene behaviors during sexual intercourse (Li, et al., 2009). The results of this first study were confirmed by research done in Changsha city: younger women with higher levels of education and substantial incomes had a greater knowledge of HPV (Gu, et al., 2010). A population-based cervical cancer screening study among 316 young women (17.1% of them HPV positive) aged 18-25 years was conducted with results indicating that the women in this study also had a low awareness level of HPV; only 39.6% of younger Chinese women had heard of HPV and 76.8% of them linked HPV with cervical cancer (Hu, et al., 2011).

Even though it is not yet available on the market in mainland China at the time of this writing (2015), after receiving education about the HPV vaccine, the majority of Chinese women (84.6%) were willing to receive the vaccine because of their fear of HPV infection and genital warts. The primary reason for unwillingness to be vaccinated earlier was doubt about the source of the vaccine - that is whether it is released by the government or not. Chinese women preferred to receive vaccinations from the government and medical organizations rather than pharmaceutical companies (Li, et al., 2009). Only 13% of mothers in mainland China were reluctant to have their daughters vaccinated. Most of these women doubted the safety of the vaccine and many believed that their daughters were too young to be vaccinated as well as too young to be sufficiently informed about sexual behavior. The general preference was not to explain too much, particularly the “sex part,” to their teenage daughters with the rationale that their daughters were so young that there was no need for them to be informed, or that the mothers themselves simply did not know how to explain the details. A small minority (about 10%) of the mothers were concerned about a potential encouragement of early sex

or promiscuity. However, most Chinese women felt that, regardless of HPV vaccination, they would teach their daughters to behave “properly,” thus indicating that sexual promiscuity should not be a major issue (Li, et al., 2009).

Since 2006, HPV vaccine had became available on the Hong Kong and Taiwan markets (Hsu, Hsu, Cheng, Fetzer, & Chou, 2010). A higher proportion of Chinese women living in these regions than those living on the mainland heard of HPV infection and HPV vaccine. Based on research by Kwan and colleagues (2009), 62% of 1,450 Hong Kong women aged 18 and above had heard the term HPV. The Chinese name for HPV includes characters pertaining to the breast or nipple. As a result, many participants mistakenly thought that the virus was related to a disease of the nipple, or something related to female hormones. Of the Hong Kong Chinese women, 50% had heard of vaccination against cervical cancer, and 88% of the Hong Kong Chinese women (n = 1, 219) indicated they would likely be vaccinated (Kwan, et al., 2009). Research among young women living in Taiwan suggested that 38% of Chinese women who underwent HPV vaccination were older than 26 years. Recommendations from family and health care providers were the main reasons these women received the HPV vaccination, making self-awareness of HPV infection and personal knowledge the primary factors that encouraged them to do so. After educational intervention, 98.4% of the young Chinese women living in Taiwan reported they would electively receive a HPV vaccination because of their fear of suffering from cervical cancer and their belief that the vaccine could benefit them (Hsu, et al., 2010).

According to Kwan and colleagues (2009), as soon as Hong Kong Chinese women learned that HPV infection was sexually transmitted, they stigmatized it as a type as a type of STI. Some Chinese women, particularly the younger ones, blamed themselves for contracting the infection and sought to keep it a secret in order to protect their reputations. Women with a history of only one sexual partner tended to express anger and blame their partner for the infection. Interviews showed that nearly half of the participants perceived an adverse impact on relationships with their partner, family, or friends if they were HPV infected. For 42% of the infected participants, the impact was considered serious enough to end their intimate relationship (Kwan, et al., 2009). According to Jeng, Lin, and Wang (2010), women who contracted HPV received very little support from their partners, families, and friends. However, they were more likely to encourage their partners and friends to have medical checkups and Pap smear tests. In addition to HPV affecting the families and relationships of these women, their sexual behaviors were also impacted. Many of them lost the desire to engage in intercourse and reduced the frequency of sexual activity (Jeng, Lin, & Wang, 2010). Similar results were found in another study from the same research group that sought to explore the psychological responses of Chinese women in Hong Kong to HPV infection (Lin, Jeng, & Wang, 2011).

Chinese women in Taiwan confirmed the perception of stigmatizing HPV infection as a type of STI and, by extension, HPV vaccination. Research with a focus group conducted by Lee and colleagues (2007) showed that Chinese women in Taiwan were resistant to accepting that HPV could lead to cervical cancer. Because participants were reluctant to be vaccinated against a type of STI, they insisted that they were not

having sex with anyone other than their trusted partner and they did not engage in unsafe sex. One woman summarized the sentiment well, noting that, “If it *(HPV vaccine)* is used to prevent sexually transmitted diseases, then I do not see any need for it” (p. 132). It was suggested by many Chinese women that “the link between cervical cancer and a sexually transmitted infection need not be publicized in promotional campaign for fear of ‘turning people away’ or promoting ‘discrimination against women with cervical cancer’”(Lee, et al., 2007).

A study conducted among adolescent girls aged 13–20 years old in Hong Kong showed that all participants have have heard of cervical cancer from mass media, but none had any knowledge about HPV (Kwan et al., 2008). After being educated by facilitators, the girls held a favorable attitude toward HPV vaccination, but did not believe that it was necessary for them at the moment. Their attitudes and perceived support from family or peers significantly correlated with their intention to be vaccinated and their willingness to conform. A study among 845 female undergraduate students in Taiwan found that more than 50% of the participants were aware of HPV and the vaccine, and that 63% of them intended to receive a vaccination. Age, a family history of gynecologic cancer, a personal history of gynecological visits, sexual experience, and awareness of the vaccine were all significant predictors of the intention to receive an HPV vaccination. Also, Hong Kong Chinese women who had a high intention to be vaccinated felt they were susceptible to HPV infection, considered cervical cancer a severe disease or result of STI, and believed in the efficacy of HPV vaccines. A

few of the external influences on their decision to be vaccinated were the cost, availability, and recommendation from a physician (Hsu et al., 2009).

Several studies related to Pap smear tests and cervical cancer have been conducted to examine the perceptions of Chinese women living abroad (Chang, Woo, Yau, Gorzalka, & Brotto, 2013; Hislop et al., 2004; Ji, Chen, Sun, & Liang, 2010; Nguyen, et al., 2012; Strong & Liang, 2009). According to Ji and colleagues (2010), a study among 473 asymptomatic Chinese-American female participants aged 50 and older showed that 50.5% of them had received regular Pap smear tests. The study indicated that women who were more likely to hold Chinese cultural views were less likely to receive regular screenings (Ji, et al., 2010).

A study among 162 Chinese-American women recruited from urban community settings in California (aged 18 years and older) conducted by Nguyen and colleagues (2012) indicated that only 19% of the Chinese-American women had heard of HPV, and 18.9% had heard of a vaccine to prevent cervical cancer. After receiving the brief information contained in the survey, regardless of HPV's STI nature, HPV vaccine acceptance was higher when the cost of the vaccine was not a factor. Thirty-eight percent of the women noted that they had had a Pap smear test within the last 3 years. Those women with health insurance were more likely to be aware of a vaccine against cervical cancer. Also, those who spoke English were more likely to support their daughters or granddaughters who wanted to receive the vaccination, and were more likely to feel that the HPV vaccine could prevent STI. In conclusion, their awareness and acceptance of the HPV vaccination was associated with their insurance status and English proficiency (Nguyen, et al., 2012).

A qualitative study of cervical cancer screening in Canada among Chinese immigrants women with an average age of 53 years old conducted by Chang and colleagues (2013) suggested that Chinese immigrant women heavily endorsed a traditional medicine philosophy and valued prevention over screening and interceptive measures. These women saw it more favorable to prevent the disease than to rely on screening tests because they believed that early detection of cancer is difficult. Also, a Pap smear test was described as a different procedure from other cancer screenings. The women viewed the Pap smear test through a sexual lens. Because the test requires exposing one's genitalia, an area that should only be viewed during sexual activity, Chinese immigrant women correlated the test with sexual activity and promiscuity. Women complained about the compulsory and depersonalized manner in which Pap smear tests are performed in their home country of China, where the government and employers organized the tests for them, enhancing their feelings of embarrassment (Chang, et al., 2013).

In conclusion, Chinese culture still has a strong influence on Chinese women's acceptance of HPV screening behaviors and HPV vaccine. Still, due to the age range of the participants, there was limited research that specifically studied young Chinese women living in the United States regarding their knowledge, attitudes, and perceptions of the HPV vaccination.

CHAPTER 3. QUANTITATIVE PAPER ONE: CHINESE INTERNATIONAL STUDENTS' AWARENESS AND KNOWLEDGE OF HPV INFECTION AND HPV VACCINATION

3.1 Abstract

As increasing number of Chinese international students (CIS) are living and studying in the U.S., this specific ethnic group has become a candidate for HPV vaccination promotion. This study aimed to examine CIS' awareness and knowledge about HPV vaccine, HPV infection, cervical cancer and genital warts. During the summer and fall of 2013, CIS (N=350) attending a Midwestern university in the U.S. were recruited to take part in a online anonymous survey. Findings revealed that only 27.2% of the CIS had heard of the HPV vaccine; 38.1% of CIS had heard of HPV; 55.9% had heard of genital warts and 95.4% of them had heard of cervical cancer. However, CIS exhibited little knowledge about the causes of cervical cancer and genital warts, only 20.4% of them knew HPV can cause genital warts, and 32.1% of them knew that HPV can cause cervical cancer. Female CIS had a higher degree of awareness and knowledge of HPV infection and vaccination. While graduate students were more aware of HPV, undergraduates and participants under the age of 21 had a higher knowledge level of HPV infection and vaccination. Participants who had previously had sexual intercourse exhibited a higher degree of awareness of HPV, the HPV vaccine, cervical cancer, and

genital warts. In conclusion, CIS had a very limited awareness, and low knowledge level, of HPV vaccine, cervical cancer and genital warts.

3.2 Introduction

3.2.1 Chinese International Students

Increasing numbers of international students have migrated to the United States to pursue degrees in higher education (Institute of International Education, 2012a). In 2012, international students accounted for 3.7% of the total students enrolled in U.S. institutions of higher education (Institute of International Education, 2012b). In the 2011–2012 academic year, there were 194,029 CIS studying in the United States, that is 25.4% of the total number of international students that year (up from 23.1% the previous year) (Institute of International Education, 2012c). In the same academic year, the total of CIS comprised 38.4% undergraduate students, 45.6% graduate students, 9.5% optional practical training (OPT) students, and 6.5% others (Institute of International Education, 2012b).

The huge number of minority ethnic students has become an important focus group for both health interventions and also candidate for HPV vaccination due to several important reasons (Tung, Lu, & Cook, 2012). According to Tung and colleagues (2013), as Chinese students move to the United States, they may become susceptible to adopting not only the cultural expressions of the host country such as food choices, but also health behaviors of the host country, as they navigate through their heritage culture and the mainstream US culture. Previous research in Canada showed that Asian immigrants adopt western sexual behaviors when they migrate to western countries which might put them at more

risk of STI. Asian students were more likely to report having had their first sexual intercourse at an older age with a lower frequency of intercourse overall than members of other populations, and female college students were less likely to report sexual experiences than their male counterparts (Meston, Trapnell, & Gorzalka, 1996). However, several studies of Asian immigrants in Canada indicated that long-term residents tend to adopt sexual practices similar to those of the mainstream culture (Meston, Trapnell, & Corzalka, 1998), which might put them at risk for sex-related infections.

3.2.2 HPV Infection and HPV Vaccination

Human Papillomavirus, one of the most common STIs, has been established as a cause of cervical, anal, oropharyngeal and oral cancers and other diseases such as genital warts (Harper & Paavonen, 2008). Cervical cancer ranks as second among the leading cancers that affect women worldwide, and over 85% of cases occur in developing countries (Ferlay et al., 2010). The People's Republic of China accounts for 14% of the world's annual incidence of cervical cancer (Hu et al., 2011). Each year, 30,000 deaths from approximately 100,000 cases of cervical cancer are reported (Parkin et al., 2005). According to Li et al. (2011), the crude incidence rate of cervical cancer is 8.55 per 100,000 women. There is a call for vaccination among the young women of China along with those of other developing countries (Agosti & Goldie, 2007).

Currently, there are two types of prophylactic HPV vaccines on the market: the quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) and the bivalent vaccine Cervarix ® (GlaxoSmithKline, Belgium). These two types of vaccines are available in the United States, Canada, Australia, and most of Europe (Harper & Paavonen, 2008), Hong Kong, and Taiwan. Although both pharmaceutical companies are

conducting clinical trials in China, an HPV vaccine has not yet been licensed in mainland China (Cancer Foundation of China, 2014).

Studies on mainland China indicate that levels of HPV knowledge are generally low. A cross-sectional study conducted among 8,188 women of all age groups living in three major cities and rural areas of China suggested that 15.5% of Chinese women had heard of HPV. Among these, only 48.2% knew that HPV is related to cervical cancer, and 8.1% knew that it is associated with genital warts. Women's awareness differed among the rural and metropolitan areas. Only 18.6% of women in rural areas knew that HPV is a STI compared with the higher rate of 23.1% of those in urban areas; and even fewer women in both areas (8.1%) knew that HPV is associated with genital warts. Factors influencing HPV awareness included medical history, education, occupation, smoking status, alcohol use, and hygiene behaviors during sexual intercourse (Li et al., 2009). The results of this first study were confirmed by research done in Changsha city, China: younger women with higher levels of education and better income had greater knowledge of HPV (Gu, Chan, & Twinn, 2010).

Contrarily, research conducted among Chinese women in Hong Kong and Taiwan showed that these women had higher level of knowledge about HPV vaccination compared with women of mainland China. Research by Kwan and colleagues (2009) showed that, 62% of 1,450 Hong Kong women aged 18 and above had heard the term HPV and 50% had heard of vaccination against cervical cancer. Kwan and colleagues also reported that since the Chinese name for HPV includes characters pertaining to the breast or nipple, many participants

mistakenly thought that the virus was related to a disease of the nipple, or was something related to female hormones. Another study conducted among girls 13–20 years old in Hong Kong, showed that all participants had heard of cervical cancer from the media, but none had any knowledge of HPV (Kwan et al., 2008). Also, a study among 845 female Taiwanese undergraduate students found that more than 50% of them were aware of HPV and HPV vaccine, and 63% of them intended to receive an HPV vaccination (Hsu et al., 2009).

Similar to findings among Chinese women in Hong Kong and Taiwan, studies among US college students have reported higher levels of awareness of HPV. Mehta and Sharma (2011) reported that 81.1% of US college students in their study, which included both male and female have heard of HPV. Also, a study conducted among 1,975 female U.S. college students aged 18–23 years showed that 95% had heard about the HPV vaccine GARDASIL® (Bendik, Mayo, & Parker, 2011). Among this group, only 30.4% knew that HPV was the most common STI on campus. Most knew that HPV infection can be asymptomatic and that HPV may cause cervical cancer; however, few knew of the potential consequences of HPV and its mode of transmission (Bendik, et al., 2011). According to Gerend and Barley (2009), 83% of 295 US male college students had heard about HPV, the majority of whom had learned about it from a health education class, television, or friends. However, only half had heard about HPV vaccination. Male college students in the study were confused about the distinction between genital warts and genital herpes, and less than 25% were aware of the connection between HPV and anogenital cancers (Gerend & Barley, 2009). Female U.S. college students were more aware of HPV infection and HPV vaccines than their male counterparts (Sandfort &

Pleasant, 2009), and knowledge affected people's accessibility to the vaccine in some of the studies (Ferris et al., 2009; Lenselink et al., 2008).

Unfortunately, these studies did not focus on CIS despite their large enrollment in American universities. As such, little is known about CIS' awareness and knowledge of HPV infection and vaccination. Thus, the purpose of this study is to explore: (a) CIS' awareness of HPV/HPV vaccination; (b) CIS' knowledge of HPV/HPV vaccination; and (c) how factors such as age, sex, and length of living in the United States affect HPV/HPV CIS' vaccination awareness and knowledge. By focusing on this section of the population - CIS who came from China and are living in the US - our study is the first to explore CIS' awareness and knowledge of HPV infection and HPV vaccination, which will help address the information gap that currently impedes efforts to develop culturally appropriate HPV vaccine promotion programs for this population.

3.3 Methods

3.3.1 Participants recruitment

Participants were recruited from a large Midwestern University. A survey -recruiting email (Appendix A) was sent out all CIS through the university registrar's office. The survey-recruiting email included a link to the survey approximately 15 minutes. Upon clicking the link, participants were provided with a one-page information page (Appendix D) about the purpose of the study, the duration of the survey, their right to withdraw from the study at any time or skip questions that make them uncomfortable, and a link to indicate their consent

to participate in the study. The first email was followed by two reminder emails (Appendix C) to encourage participation.

Using convenient sampling method, participants were also recruited through the University Chinese Student Association and local campus Chinese organizations. Participants were also contacted through online chat rooms, and Chinese student network websites. The CIS who met the following criteria were encouraged to participate in the study: (a) 18 years of age or older; (b) born in mainland China (we excluded Taiwan and Hong Kong because HPV vaccine was available in both regions); and (c) holding F1 student visa status while studying in higher education institutions in the United States.

3.3.2 Data Collection

This study used an original 47-item online survey for data collection. The online survey was built using the university's Qualtrics survey system. The content validity of the survey (Litwin, 1995) was established by using questions adapted from two previously tested, validated, and published survey questionnaires used among Chinese women living in Hong Kong (Kwan et al., 2009; Kwan, et al., 2008). Two CIS who were PhD students in the US reviewed the survey to ensure that the questions were appropriate. The survey questions were written in both English and Chinese: Chinese on top and English translation underneath, to enhance participants' understanding of the questions. The more sensitive questions regarding their sexual behavior were placed at the end of the survey questionnaire, thus participants could finish answering the less personal questions first. During the survey process, participants could skip one or more questions and move to the next with no difficulty. Participants could also skip the entire pages of questions if they were not interested.

There were three phases of the survey: pre-information knowledge and awareness, information session, and post-information intention and belief about HPV vaccination. There are six sections of the survey: 1) demographic information, 2) HPV and HPV vaccine awareness and knowledge, 3) fact about HPV Infection and HPV vaccine, 4) HPV vaccination status and intention of HPV vaccination, 5) beliefs about HPV infection and HPV vaccine and 6) sexual history and sexual behaviors. The demographic section has 8 questions including age, sex, level of study, length of living in the United States, having taken a class in sex education, religious preference and health insurance status. The HPV and HPV vaccine knowledge section contains 4 items addressing the HPV, HPV vaccine, genital warts and cervical cancer awareness. It also contains 12 true/false statements about HPV infection and HPV vaccine with answer choices of “True,” “False” and “I don’t know.” The third section provided information and facts about HPV and the HPV vaccine. The fourth section contains questions about HPV vaccine status and intention of HPV vaccination, with two options such as “ Yes” and “No,” and six Likert scales ranging from “very unlikely” to “ very likely.” The fifth section contains questions regarding beliefs about HV infection and HPV vaccine with Likert scale options ranging from “disagree” to “ agree;” “ very unlikely” to “ very likely” and “ very unwilling” and “ very willing.” The sixth section includes 13 multiple choice questions about relationship status, sexual intercourse experience, number of sex partners, the age at first sexual intercourse, methods for safer sex, condom use, previous diagnosis of STIs and result of most recent Pap Smear Test. It also included space for participants to give comments and feedback. However, only the results from the demographic section, the

HPV and HPV vaccine awareness and knowledge section, and two items from sexual history and sexual behavior section are presented in this chapter.

3.3.3 Data Analysis

A total of 751 students participated in the online survey and 544 surveys were completed (72.4% completion rate). After data screening, there were 449 surveys taken by participants aged between 18 to 26. Surveys with participants older than 26 years were excluded from the later analysis because those participants were not within the Advisory Committee on Immunization Practice (ACIP) recommended age range. Among those 449 surveys, 99 participants (all female) had received HPV vaccinations. The vaccination rate among female participants was 36.9%. Those 99 surveys were also excluded from later analysis. In total, this study reported the data from 350 surveys of participants aged between 18 to 26 years old and who had not yet received HPV vaccination. Preceding statistical analysis, all quantitative data were screened for accuracy, representation, and quality. Among the 350 surveys, the missing data such as age were substitute with average values. Other missing values of the awareness and knowledge questions were filled out with “I don’t Know” choices.

Data were analyzed using the Statistical SPSS (20.0 version) software. Percentages, frequency distribution, mean, and standard deviation were used to describe demographic variables, awareness, and knowledge of HPV infection and vaccination. Chi-square tests were used to measure the differences in awareness by factors of age, sex, level of study, length of stay in the United States, having taken a course on sex edcation, relationship status, and sexual intercourse. Participants were divided into two groups for each social demographic factor. The total knowledge scores were calculated as the

number of the correct choices of the 12 statement items used to measure HPV/HPV vaccination-related knowledge. Statements numbered 4, 10, and 11 were false statements, and the remaining 9 statements were all true statements. Every correct option of the statements, excluding the option: “I don’t know” was scored as one. Thus, 0-12 was the range of the total number of correct knowledge statement scores; higher scores indicated accurate knowledge of HPV/HPV vaccination. Participants were divided into low knowledge (score from 0-6) and high knowledge (score from 7-12) level groups. Missing values were coded as “zero.” Odds ratios were used to measure the association between HPV and HPV vaccination knowledge scores and the demographic variables by the two groups (low knowledge level group and high knowledge level group). A Pearson correlation coefficient test was employed to estimate the linear relationship between age and HPV infection and HPV vaccination knowledge scores.

3.4 Results

3.4.1 Demographic characteristics of participants

Demographic information of participants is presented in Table 1. The mean age of the 350 participants was 21.4 years (SD=2.4), with the group comprising 48.30% females and 51.1% males. Over one-third of the participants were graduate students (38.7%) and the remaining were undergraduates. The length of time the participants had lived in the United States was calculated as: less than 2 years, 58.5%; from 2 to 4 years, 31.2%; and more than 4 years, 10.3%. Of all the participants, 38.5% have had a class in human sexuality. The majority of the participants expressed no religious preference; almost all (93.7%) had

health insurance in the United States; 62.0% were single, 34.6% were dating and 34.6% of the participants (n=121) answered that they had previously engaged in sexual intercourse.

3.4.2 Levels of awareness and knowledge

The participants' awareness and levels of knowledge on individual items regarding HPV and HPV vaccination are presented in Table 2.

Most participants had heard of cervical cancer (95.4%); while only 55.9% were aware of genital warts; and 38.1% participants had heard of HPV; while only 27.2% were aware of an HPV vaccine.

The mean knowledge score for participants was 4.34 (SD=1.7), meaning the average participant was able to answer 4 out of the 12 statements correctly. For each of the 12 statements, more than 50% of the participants answered "I don't know." The statement "Using a condom can totally prevent HPV" received an "I don't know" answer from 77.6% of the participants. The statement "HPV can cause genital warts" was marked "True" by 20.4% of the participants compared with 32.1% who answered "True" to "HPV can cause cervical cancer." The statement that received the lowest percentage of participants (16.3%) answering "True" was "Only certain types of HPV cause cervical cancer."

3.4.3 Demographic difference of HPV/HPV vaccination awareness

As shown in Table 3, Chi-square tests were used to examine the demographic differences of HPV/HPV vaccination awareness. Significantly, among all participants, those older (age >21 years) showed a higher level of awareness of the HPV vaccine ($p<0.05$) and genital warts ($p<0.001$); females were more aware of HPV ($p<0.01$) and

HPV vaccine ($p<0.011$); and graduate students showed a higher level of awareness of HPV ($p<0.05$). In addition, those who had been living in the United States for two years or less were more aware of HPV vaccine ($p<0.01$); those who had taken a sexuality class were more aware of HPV ($p<0.01$), HPV vaccine ($p<0.05$), and genital warts ($p<0.05$); while, those who were not single had a higher level of awareness of genital warts ($p<0.01$); participants who had previously engaged in sexual intercourse were more aware of HPV ($p<0.01$), HPV vaccine ($p<0.01$), cervical cancer ($p<0.05$), and genital warts ($p<0.001$).

3.4.4 Demographic factors associated with knowledge

As seen in Table 4, odds ratio (OR) analysis was used to determine the association between HPV/HPV vaccination knowledge and demographic variables. Significantly, among all participants, females showed a 1.255 times higher knowledge level than males ($p<0.05$); undergraduate students showed a 1.252 times higher knowledge level than graduate students ($p<0.05$); those who had taken a sexuality class had a 0.693 times lower knowledge level than those who had not ($p<0.01$); and, participants who had previously engaged in sexual intercourse had a 0.798 times lower knowledge level than participants who had no such experience ($p<0.05$).

3.5 Discussion

This study assessed the awareness and knowledge of HPV infection and HPV vaccination among Chinese International Students (CIS) who were matriculating in a large Midwestern university in the United States. Generally, CIS had lower level of awareness and knowledge about HPV infection and HPV

vaccine compared with other social groups. Among CIS that had not received HPV vaccination, 38.1% of them had heard of HPV and 27.2% of them had heard of HPV vaccine. The percentage of those who had heard of HPV was similar to that found among young mainland Chinese women (39.6%) (Hu, et al., 2011), and lower compared with U.S. college students (95%), women in Hong Kong (62%), and women in Taiwan (50%).

Although sex education has been included in the formal curricula of secondary schools in China since 1988, in practice it is apparently limited (Tung, et al., 2012). Similar to the findings of previous research that only 40–53 % of college students in China received school based sex education, our result showed that 38.5% of CIS had classes in human sexuality (Li, et al, 2004; Albrektsson, et al. 2009). The lack of formal sex education may contribute to the limited HPV infection related diseases and human reproductive knowledge among CIS. For example, participants generally were not aware of the causes of cervical cancer and some participants did not know the location of the cervix. Only 32.1% participants answered correctly that HPV can cause cervical cancer, and only 20.4% CIS answered that HPV can cause genital warts.

As had been found in previous research among U.S. university students (Gerend & Barley, 2009; Gerend & Shepherd, 2012; Mehta & Sharma, 2011), our study found that female CIS had a higher awareness and knowledge level of HPV infection and vaccination than their male counterparts. However, there were more male participants than female who had heard of genital warts. This finding is consistent with the previous research finding that male CIS were more knowledgeable about HIV/AIDS than female CIS (Tung, et al., 2012).

This study also showed that even though graduate students had a better awareness of HPV, participants younger than 21 and undergraduates had higher knowledge levels of HPV infection and HPV vaccination. This result is also consistent with previous research that undergraduate CIS were likely to mention a school teacher as a source of HIV/STI information compared to graduate CIS (Tung, et al., 2012). This could be explained by the fact that the younger students were more likely to have had school sexual health classes. Participants who had lived in the United States for less than two years had a better awareness of the HPV vaccine, which might be explained by the fact that it was the younger participants who scored higher on the awareness of the vaccine. This result may also be related to the fact that these younger people were within the recommended age range for HPV vaccination and, as the focus group participants said, they were more likely to recommend the vaccination to their friends. Participants who had previously engaged in sexual intercourse were more aware of HPV, HPV vaccine, cervical cancer, and genital warts; however, those participants exhibited lower knowledge scores compared with those who had not previously had sexual intercourse.

3.6 Limitation and future implementation

The study was conducted at a large research one Midwest university. Limitations of this study include the limited sample size drawn from a single university. As a result, the findings of this study might not be representative of other regions or universities in the US. Also, a relatively low response rate for questions near the end of the survey on sexual history and behaviors was observed.

Participants might have been unwilling to answer these questions, or that the survey was too long for participants to comforablely complete. There was a lack of data about the acculturation sexual experience of CIS before and after they came to the U.S.. Future studies should examine sexual behaviors influenced by acculturation among CIS. Furthermore, future studies should also extend the measurement of sexual behaviors, knowledge and behaviors for STI prevention among CIS.

HPV vaccine should be further promoted including formal education about HPV infection, cervical cancer and genital warts among CIS. Governmental agencies and school based education programs should collaborate on promoting HPV vaccination and sex education among CIS.

CHAPTER 4. QUANTITATIVE PAPER TWO: SEX DIFFERENCE OF CHINESE INTERNATIONAL STUDENTS' BELIEFS AND INTENTION OF HPV VACCINATION

4.1 Abstract

As increasing numbers of Chinese international students (CIS) are living and studying in United States, this specific ethnic group has a focus of HPV vaccination promotion. This study aimed to examine CIS' perceptions and intentions regarding HPV vaccination. During the summer and fall of 2013, CIS attending a Midwestern university in the United States were recruited to take part in an online anonymous survey questionnaire. A survey of 350 CIS participants aged between 18 to 26 years who had not been vaccinated against HPV were included in the data analysis. Results showed that 69.2% female CIS compared with 34.9% male CIS were likely to receive the HPV vaccine in the future. More female than male CIS thought both sexually active women, and women or girls who have not had sex, should be vaccinated. Significantly, more female than male CIS thought that HPV infection would influence their romantic relationship and that their families would suspect them of sexual impropriety if they became HPV infected. Furthermore, more females than males thought their family and partners would support their decision to receive an HPV vaccination, and would be more likely to comply with recommendations for vaccination from their doctor, parents, and

friends. Among all these influences, the vaccination behavior of best friends was the only significant predictor of CIS' vaccination intention.

4.2 Introduction

In the United States, the first prophylactic quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) was licensed by the FDA in 2006. The vaccine was proven to be effective in preventing the four strains of HPV (HPV 6, 11, 16, 18) responsible for 70% of cervical cancer and 90% of genital warts (Colgrove, 2006). The Advisory Committee on Immunization Practices (ACIP) recommended children as young as 9 years old be vaccinated, with catch-up vaccinations available until the age of 26. In 2010, the vaccine was also recommended for males to prevent genital warts and HPV infection of their sexual partners (Bednarczyk, Davis, Ault, Orenstein, & Omer, 2012; Ylitalo, Lee, & Mehta, 2013). According to CDC, college students and young adults19 to 26 years old were also recommended for HPV vaccination beside influenza vaccine and Tdap vaccine (CDC, 2014).

College students in the United States have a comparatively high level of knowledge about HPV vaccination. A study conducted among 1,975 female college students aged 18–23 years showed that 95% had heard about the HPV vaccine GARDASIL® (Bendik, Mayo, & Parker, 2011). Another study conducted by Mehta and Sharma (2011) confirmed that 81.1% of the female college students had heard of HPV. According to Gerend and Barley (2009), 83% of 295 male college students had heard about HPV and the majority of them had learned about HPV from a health education class, television, or friends (Gerend & Barley, 2009). Female college students were more aware of HPV infection and HPV vaccines compared to their male counterparts (Sandfort

& Pleasant, 2009), and knowledge affected people's accessibility to HPV vaccine in some of the studies (Ferris et al., 2009; Lenselink et al., 2008). The majority of college women are interested in GARDASIL®, and 85% to 88% of participants intend to become vaccinated (Gerend & Magloire, 2008; Jones & Cook, 2008; Kahn et al., 2003). However, college men reported moderate interest in the HPV vaccine and even after being informed of the benefit that male HPV vaccination reduces a woman's risk of cervical cancer, men showed no increased interest in the vaccine (Gerend & Barley, 2009). The different acceptability of HPV vaccination between female and male college students may be due to different decision- making processes and issues with respect to vaccinating boys and girls (Liddon, Hood, Wynn, & Markowitz, 2010).

In the 2011–2012 academic year, there were 194,029 Chinese international students (CIS) studying in the United States, accounting for 25.4% of the total number of international students, up from 23.1% the previous year (Institute of International Education, 2012b). Since the 2008–2009 academic year, China has been the number one country of origin for these international students (Institute of International Education, 2012a). As Chinese students immigrate to the United States, they may become susceptible to acculturate not only the cultural expressions of the host country but also the health behaviors, which might put them at risk for sex-related infections. This huge subset of ethnic minority students has become an important focus group for health interventions (Tung, Lu, & Cook, 2012). Yet despite their visible presence at American universities, little is known about their beliefs and intentions of HPV vaccination.

The People's Republic of China account for 14% of the world's annual incidence of cervical cancer, and the number of HPV infections among young Chinese women is rising (Hu et al., 2011). Each year, 30,000 deaths are reported from approximately 100,000 cases of cervical cancer (Parkin et al, 2005). However, there has been a lack of access to screening tests for cervical cancer among young, unmarried women in China and in developing countries, creating an urgent need for vaccination among young Chinese women (Agosti & Goldie, 2007).

Even though HPV vaccine is not yet available on the market in mainland China (China Cancer Foundation, 2013), after receiving education about the vaccines, the majority of mainland Chinese women (84.6%) said they were willing to have one administered because of a fear of HPV infection and genital warts. The primary reason for unwillingness to be vaccinated was doubt regarding the source of the vaccination. Chinese women preferred to acquire vaccinations from the government and medical organizations rather than pharmaceutical companies (Li et al., 2009). In Taiwan, after an educational intervention, 98.4% of the young Chinese women reported they would electively receive an HPV vaccination for two main reasons: they believed the vaccine could benefit them and they feared suffering from cervical cancer (Hsu, Hsu, Cheng, Fetzer, & Chou, 2010). A study among 845 female Taiwanese undergraduate students found that more than 63% of them intended to receive an HPV vaccination. Age, a family history of gynecologic cancer, a personal history of gynecological visits, sexual experience, and awareness of the vaccine were all significant predictors of the women's intention to receive an HPV vaccination (Hsu et al., 2009). Another study conducted among adolescent girls aged 13–20 in Hong Kong, showed that participants held a

favorable attitude toward HPV vaccination, but did not believe that vaccination was necessary for them at that time. Their attitudes and perceived support from family or peers significantly correlated with their intention to be vaccinated and their willingness to conform (T. T. C. Kwan et al., 2008). Chinese women immigrants living in California reported that their acceptance of the HPV vaccination was associated with their insurance status and English proficiency. Female Chinese immigrants women who spoke English were more likely to support their daughters or granddaughters' vaccination decision, and were more likely to think that HPV vaccine could prevent an STI (Nguyen, Chen, & Chan, 2012).

Although studies have been conducted among Chinese women worldwide regarding HPV vaccination, there is limited research that has investigated the intentions and beliefs about HPV vaccination among young Chinese adults studying and living in the United Students as international students. Thus, the purpose of this investigation was to measure: (a) how likely is it that CIS will receive the HPV vaccine? (b) how factors such as sex, age, and length of living in the United States influence CIS' intention to receive the HPV vaccination? (3) what CIS believe about HPV infection and HPV vaccination?

4.3 Methods

4.3.1 Participants recruitment

Participants were recruited from a large research one Midwestern University. A survey (Appendix A) -recruiting email were sent out as a group email to all CIS through the university registrar's office. The survey-recruiting

email included a link to the survey approximately 15 minutes. Upon clicking the link, participants were provided with a one-page information publication(Appendix D) about the purpose of the study, the duration of the survey, their right to withdraw from the study at any time or skip questions that make them uncomfortable, and a link to click on if they consent to participate in the study. The first email was followed by two reminder emails (Appendix C) to encourage participation.

Using convenient sampling method, participants were also recruited through the University Chinese Student Association and local campus Chinese organizations. Participants were also contacted through online chat rooms, and Chinese student network websites. The CIS who met the following criteria were encouraged to participate in the study: (a) 18 years of age or older; (b) born in mainland China (we excluded Taiwan and Hong Kong because HPV vaccine was available in both regions); and (c) holding F1 student visa status while studying in higher education institutions in the United States.

4.3.2 Data Collection

This study used an original 47-item online survey for data collection. The online survey was built using the university's Qualtrics survey system. The content validity of the survey (Litwin, 1995) was established by using questions adapted from two previously tested, validated, and published survey questionnaires used among Chinese women living in Hong Kong (Kwan et al., 2009; Kwan, et al., 2008). Two CIS who were PhD students in the US reviewed the survey to ensure that the questions were appropriate. The survey questions were written in both English and Chinese: Chinese on top and English translation underneath, to enhance participants' understanding of the questions. The more sensitive questions regarding their sexual behavior were placed at the end of

the survey questionnaire, thus participants could finish answering the less personal questions first. During the survey process, participants could skip one or more questions and move to the next with no difficulty. Participants could also skip the entire pages of questions that they were not interested.

There were three phases of the survey: pre-information knowledge and awareness, information session, and post-information intention and belief about HPV vaccination. There are six sections of the survey: 1) demographic information, 2) HPV and HPV vaccine knowledge, 3) fact about HPV Infection and HPV vaccine, 4) HPV vaccination status and intention of HPV vaccination, 5) beliefs about HPV infection and HPV vaccine and 6) sexual history and sexual behaviors. The demographic section has 8 questions including age, sex, level of study, length of living in the United States, having taken a class in sex education, religious preference and health insurance status. The HPV and HPV vaccine knowledge section contains 4 items addressing the HPV, HPV vaccine, genital warts and cervical cancer awareness. It also contains 12 true/false statements about HPV infection and HPV vaccine with answer choices of “True,” “False” and “I don’t know.” The third section provided information and facts about HPV and the HPV vaccine. The fourth section contains questions about HPV vaccine status and intention of HPV vaccination, with two options such as “ Yes” and “No,” and six Likert scales ranging from “very unlikely” to “ very likely.” The fifth section contains questions regarding beliefs about HV infection and HPV vaccine with Likert scale options ranging from “disagree” to “ agree;” “ very unlikely” to “ very likely” and “ very unwilling” and “ very willing.” The sixth section includes 13 multiple choice questions about relationship status, sexual intercourse experience, number of sex partners, the age at first

sexual intercourse, methods for safer sex, condom use, previous diagnosis of STIs and result of most recent Pap Smear Test. It also included space for participants to give comments and feedback. However, only the results from the demographic information, Fact about HPV Infection and HPV vaccine, HPV vaccination status and intention of HPV vaccination, Beliefs about HPV infection and HPV vaccine and sexual history and sexual behaviors are presented in this chapter.

4.3.3 Education materials.

Assuming that not all of the participants were aware of HPV vaccine or had enough knowledge regarding it, after assessing the awareness and knowledge of HPV infection and HPV vaccination among CIS, we designed a small educational session (Appendix A) in the middle of the survey for participants to read before answering the intention and belief questions. The information provided in the education session were:

Facts about HPV infection and HPV vaccine

Facts about HPV

- HPV comprises a group of viruses. Different HPV strains, through different transmission modes, cause different diseases such as genital warts and skin warts
- Some HPVs are called high-risk HPVs because they are known to cause cervical cancer. These high-risk HPVs are mostly transmitted sexually
- Men or women may be infected with HPV, but not know it
- Having multiple sexual partners increases the risk of HPV infection.

Facts about vaccination

- ❖ Vaccination helps raise the body's defenses to fight against certain diseases, for example, vaccination against measles during infancy
- ❖ Vaccination against four strains of HPV infection is now available. The vaccines help raise the body's defenses against high-risk HPV, which decreases the risk of cervical cancer
- ❖ The current vaccines are 70% effective for preventing cervical cancer, and 90% effective for preventing genital warts
- ❖ These are prophylactic vaccines; they should be given before high-risk HPV infection takes place
- ❖ The vaccine is available currently for both females and males.

4.3.4 Quantitative Data Analysis

A total of 751 students participated in the online survey and 544 surveys were completed (72.4% completion rate). After data screening, there were 449 surveys taken by participants aged between 18 to 26. Surveys with participants older than 26 years were excluded from the later analysis because those participants were not within the Advisory Committee on Immunization Practice (ACIP) recommended age range. Among those 449 surveys, 99 participants (all female) had received HPV vaccinations. The vaccination rate among female participants was 36.9%. Those 99 surveys were also excluded from later analysis. In total, this study reported the data from 350 surveys of participants aged between 18 to 26 years old and who had not yet received HPV vaccination. Preceding statistical analysis, all quantitative data were screened for accuracy, representation, and quality. Among the 350 surveys, the missing data such as age

were substituted by average values. Other missing values of the awareness and knowledge questions were filled out with “I don’t Know” choices.

Data were analyzed using the Statistical SPSS (20.0 version) software package. Percentage, frequency distribution, mean, and standard deviation were used to describe demographic variables, awareness, and knowledge of HPV infection and vaccination. Chi-square tests were used to measure the differences in awareness by factors of age, sex, level of study, length of stay in the United States, having taken a course on sex education, relationship status, and sexual intercourse. Participants were divided into two groups for each social demographic factor. The total knowledge scores were calculated as the number of the correct choices of the 12 statement items used to measure HPV/HPV vaccination-related knowledge. Statements numbered 4, 10, and 11 were false statements, and the remaining 9 statements were all true statements. Every correct option of the statements, excluding the option: “I don’t know” was scored as one. Thus, 0-12 was the range of the total number of correct knowledge statement scores; higher scores indicated accurate knowledge of HPV/HPV vaccination. Participants were divided into low knowledge (score from 0-6) and high knowledge (score from 7-12) level groups. Missing values were coded as “zero.” Odds ratios were used to measure the association between HPV and HPV vaccination knowledge scores and the demographic variables by the two groups (low knowledge level group and high knowledge level group). A Pearson correlation coefficient test was employed to estimate the linear relationship between age and HPV infection and HPV vaccination knowledge scores.

4.4 Results

4.4.1 Demographic characteristics of participants.

Demographic information of participants is presented in Table 1. The mean age of the 350 participants was 21.4 years (SD=2.4), with the group comprising 48.30% females and 51.1% males. Over one-third of the participants were graduate students (38.7%) and the remaining were undergraduates. The length of time the participants had lived in the United States was calculated as: less than 2 years, 58.5%; from 2 to 4 years, 31.2%; and more than 4 years, 10.3%. Of all the participants, 38.5% have had a class in human sexuality. Other characteristics included: the majority of participants expressed no religious preference; almost all (93.7%) had health insurance in the United States; 62.0% were single, 34.6% were dating and 34.6% of the participants (n=121) answered that they had previously engaged in sexual intercourse.

4.4.2 Intention of HPV vaccination.

The measures of participants' intentions regarding HPV vaccination are presented in Table 5. Participants' average score of HPV vaccination intention was 4.47 out of 7. Female participants' average score of HPV vaccination intention was 5.27 compared with 3.69 of male participants. In total, there 51.4% participants answered "Likely" that they would have the vaccine in the future, including 23.1% who were "Somewhat Likely," 12.3% who were "Likely" and 16.0% who were "Very Likely, " while 22.6% of participants were undecided. For females, 69.2% of them answered "Likely" to have the vaccination in the future compared with 34.9% of males who answered "Likely" to the same inquiry. In conclusion, a significantly, higher percentage of female than male

participants answered that they were more likely to have an HPV vaccination in the future (P<0.001).

4.4.3 Beliefs about HPV/HPV vaccination.

Participants' beliefs about HPV infection vaccination are presented in Table 6.

The items titled *"Who should be vaccinated?"* dealt with what kind of women should receive an HPV vaccination, and revealed the following findings. Participants' mean scores of "Agree" to "Sexually active women should be vaccinated against cervical cancer" was 3.61/4; even higher, participants' mean scores of "Agree" to "Women with multiple sexual partners should be vaccinated against cervical cancer" was 3.69/4. Regarding the need for vaccination for cervical cancer were: 28.0% of participants agreed and 48.6% participants somewhat agreed that all women should be vaccinated; 3.4% participants disagreed and 19.7% somewhat disagreed that all women should be vaccinated; 45.4% of participants agreed and 42.3% somewhat agreed that normal health-conscious women should be vaccinated; 2.3% of participants disagreed and 2.6% somewhat disagreed that normal health-conscious women should be vaccinated; 68.0% of participants agreed and 26.3% somewhat agreed that sexually active women should be vaccinated; 2.3% of participants disagreed and 2.6% somewhat disagreed that sexually active women should be vaccinated; 74.0% of participants agreed and 21.1% somewhat agreed that women with multiple sexual partners should be vaccinated; 1.7% of participants disagreed and 2.3% somewhat disagreed that women with multiple sexual partners should be vaccinated; 40.6% of participants agreed and 38.3% somewhat agreed that women or girls who have never had sex should be vaccinated; and 4.9% of

participants disagreed and 15.4% somewhat disagreed that women or girls who have never had sex should be vaccinated against cervical cancer.

The items related to *"HPV infection stigma"* dealt with how participants thought about HPV infection and revealed the following findings: Participants' mean scores of "Agree" to "If you are HPV infected, the infection is likely from your current partner" was 3.14/4; participants' mean scores of "Agree" to "If you are HPV infected, friends will keep a distance from you" was 2.54/4. The results regarding HPV infection stigma were: 5.5% of participants answered "Likely" and 48.6% answered "Somewhat Likely" that if you are HPV infected, the infection is likely from your current partner, while 7.2% of participants answered "Unlikely" and 7.7% answered "Somewhat Unlikely" to the same inquiry; 22.8% of participants answered "Likely" and 36.0% answered "Somewhat Likely" that if you are HPV infected, the relationship with your partner will end, while 12.0% of participants answered Unlikely and 27.4% answered Somewhat Unlikely to the same inquiry; 24.3% of participants answered "Likely" and 42.0% answered "Somewhat Likely" that if you are HPV infected, your partner will suspect you of infidelity, while 12.3% of participants answered "Unlikely" and 20.0% answered "Somewhat Unlikely" to the same inquiry; 34.9% of participants answered "Likely" and 39.4% answered "Somewhat Likely" that if you are HPV infected, your family will suspect you of sexual impropriety, while 9.2% of participants answered "Unlikely" and 15.17% answered "Somewhat Unlikely" to the same inquiry; 15.5% of participants answered "Likely" and 39.4% answered "Somewhat Likely" that if you are HPV infected, friends will keep a distance from you, while 16.6% of participants answered "Unlikely" and 27.1% answered "Somewhat Unlikely" to the same inquiry.

The items regarding "*Family and partner's response*" to HPV vaccination revealed the following findings: Participants' mean scores of the response "Agree" to "If you are to be vaccinated against cervical cancer, your partner's response will be:" was 3.44/4, similarly, participants' mean scores of the response "Agree" to "If you are to be vaccinated against cervical cancer, your family's response will be:" was 3.41/4. The results regarding family and partner's response were: 51.7% of participants answered that their partner would "Agree" and 48.6% answered that their partner would "Somewhat Agree" if they were to be vaccinated against cervical cancer, while 0.9% of participants answered that their partner would "Disagree," and 7.1% answered that their partner would "Somewhat Disagree" if they were to be vaccinated against cervical cancer; 53.7% of participants answered that their family would "Agree," and 30.6% answered that their family would "Somewhat Agree" if they were to be vaccinated against cervical cancer, while 0.6% of participants answered that their family would "Disagree" and 12.3% answered that their family would "Somewhat Disagree" if they were to be vaccinated against cervical cancer.

Items regarding "*Influence for HPV vaccination*" measured how participants would react to the influence of other people regarding HPV vaccination and revealed the following findings: Participants' mean scores of willingness to "Imagine that some of your best friends have already had an HPV vaccination, how willing are you to also have it" was 3.1/4; similarly, participants' mean scores of willingness to "Imagine that your family members decide you should get the HPV vaccine, how willing are you to comply" was 3.18/4l; participants' mean scores of willingness to "Imagine that your doctor decided you should get an HPV vaccination, how willing are you to comply:" was a little

higher at 3.35/4. The results regarding influence for HPV vaccination were: 24.6% of participants answered “Very Willing” and 60.3% answered “Willing” to imagine that some of your best friends have already had an HPV vaccination, while 2.0% of participants answered “Very Unwilling” and 10.6% answered “Unwilling” to the same inquiry; 28.9% of participants answered “Very Willing” and 57.7% answered “Willing” to “Imagine that your family members decide you should get the HPV vaccine,” while 1.4% of participants answered “Very Unwilling” and 8.6% answered “Unwilling” to the same inquiry; 38.3% of participants answered “Very Willing” and 54.9% answered “Willing” to “Imagine that your doctor decided you should get an HPV vaccination,” while 0.6% of participants answered “Very Unwilling” and 3.1% answered “Unwilling”.

4.4.4 Sex differences of HPV/HPV vaccination belief.

T-tests of sex differences on four aspects of beliefs regarding: “Who should be vaccinated?”; “HPV infection stigma”; “ Family and partner’s response of HPV vaccination”; and “ Influence of HPV vaccination” are presented in Table 7.

With respect to the question *“Who should be vaccinated?”* there were statistically significant differences between males and females in the beliefs that “Normal health-conscious women should be vaccinated against cervical cancer,” “Sexually active women should be vaccinated against cervical cancer,” and “Women or girls who have never had sex should be vaccinated against cervical cancer.” Females showed higher levels of belief (3.31; $p<.01$) to “Normal health-conscious women should be vaccinated against cervical cancer” compared with males (3.3); higher levels of belief (3.63; $p<.01$) to “Sexually active women should be vaccinated against cervical cancer” compared with males (3.6);

and higher levels of belief (3.18; p<.01) to “Women or girls who have never had sex should be vaccinated against cervical cancer” compared with males (3.13).

With respect to the items regarding *“HPV infection stigma,”* there were statistically significant differences between males and females in the beliefs that “If you are HPV infected, the relationship with your partner will end,” and “If you are HPV infected, your family will suspect you of sexual impropriety.” Females showed higher levels of belief (2.8; p<.01) to “If you are HPV infected, the relationship with your partner will end” compared with males (2.64); and higher levels of belief (3.05; p<.01) to “If you are HPV infected, your family will suspect you of sexual impropriety” compared with males (2.99).

With respect to the items concerning *“Family and partner's response,”* there were statistically significant differences between males and females in the HPV infection stigma. Females showed higher levels of belief (3.49; p<.01) to “If you are to be vaccinated against cervical cancer, your partner’s response will be:” “Agree,” compared with males (3.4); and higher levels of belief (3.42; p<.01) to “If you are to be vaccinated against cervical cancer, your family’s response will be” “Agree,” compared to males (3.42).

With respect to items concerning*“Influence for HPV vaccination,”* there were statistically significant differences between males’ and females’ beliefs in friends, family, and doctor influences with regard to HPV vaccination. Females showed higher levels of agreeing to vaccination as well as (3.23; p<.01) to “Imagine that some of your best friends have already had an HPV vaccination, I am willing to also have it” compared with males (2.98); higher levels of compliance (3.31; p<.01) to “Imagine that your family

members decide you should get the HPV vaccine, I am willing to comply" compared to males (3.06); and higher levels of compliance (3.41; $p<.01$) to "Imagine that your doctor decided you should get an HPV vaccination, I am willing to comply" compared with males (3.3).

4.4.5 Variance accounted for HPV vaccination intention.

The multiple linear step-wise regression analysis of beliefs variance in HPV vaccination intention is presented in Table 8. For the model in which HPV vaccination intention was taken as a dependent variable, the analysis of variance (ANOVA) was calculated in combination with the regression and showed that this model was the best fit and statistically significant ($F = 7.118$, $p < 0.001$). Out of a total 15 predictor variables (4 aspects of beliefs about HPV infection and HPV vaccination), only one was found to be statistically significant for HPV vaccination intention: 25.6% ($r^2=0.256$) could be explained by one variable (Imagine that some of your best friends have already had an HPV vaccination, how willing are you to also have it). Friends' vaccination history was the number one predictor of HPV vaccination intention ($t = 3.227$; $p < 0.01$).

The multiple linear step-wise regression analysis of social demographic variance in HPV vaccination intention is presented in Table 9. For the model in which HPV vaccination intention was taken as a dependent variable, the ANOVA was calculated in combination with the regression, and showed that this model was the best fit and statistically significant ($F = 5.181$, $p < 0.001$). Out of a total of 8 predictor variables (age, sex, year of college, length of time living in the United States, class in sexuality, religious preference, relationship status, and sexual partners), only sex was found to be statistically significant for HPV vaccination intention: 23% ($r^2=0.230$) of the variance in HPV

vaccination intention could be explained by participants' sex. Sex was the number one social demographic predictor of HPV vaccination intention ($t = 5.999$; $p < 0.001$), such that females were had significantly higher intention of receiving HPV vaccine.

4.5 Discussion

4.5.1 HPV vaccine intention and influencing factor

Among United States college female students that 85% to 88% of them intend to become vaccinated (Gerend & Magloire, 2008), CIS reported moderate interest in receiving the quadrivalent HPV vaccine. In total, a little more than half (51.4%) of CIS would like to receive an HPV vaccine in the future. After a brief information session regarding HPV vaccine, 69.2% female CIS compared with 34.9% male CIS answered that they were likely to receive the vaccination in the future. This study is the first to examine CIS's intention of HPV vaccine though it is unclear why CIS's vaccine intention is only moderate. However, Our study showed that friends' vaccination behavior was the only significant predictor of CIS's vaccination intention. In previous research (Cao, Pauleen, & Bathurst, 2012), CIS were more likely to seek social support through interactions with their peers of the same ethnicity living in United States, thus, it is not surprising to learn that their vaccination behavior while living overseas was significantly influenced by their peers. This result is very significant in building a culturally competent HPV vaccine promotion program among CIS living in the United States campus. This result was consistent with the previous research among United States college students that perceived social norms (Bennett, 2012; Gerend & Barley, 2009) were significantly correlated with the acceptability of the HPV vaccine. Though not examined in this study, previous research suggested that among United States college students, the following

factors were all significantly correlated with the acceptability of the HPV vaccine: perceived susceptibility (Bennett, 2012; Gerend & Barley, 2009; Gerend & Shepherd, 2012; Marlow, Waller, Evans, & Wardle, 2009; Mehta & Sharma, 2011); perceived benefits (Bennett, 2012; Gerend & Barley, 2009; Marlow, et al., 2009); personal experience of STI infection, sexually active and multiple sexual partners (Gerend & Barley, 2009).

4.5.2 Sex difference

Compared with male CIS, the results showed that female CIS were more likely to be influenced by other people's vaccination behavior and recommendations, and more likely to comply with doctor, parents, and friends behavior and recommendations. Future study is suggested to explain this phenomenon. To take advantage of those results, the promotion strategy of HPV vaccine among female and male CIS should be different, and this result should also be tested among other ethnic groups of college students. In general, this study reported significant differences of HPV vaccination intention and belief between female and male CIS. Female CIS were generally more interested and concerned about HPV infection and HPV vaccination than their male counterparts. This result is similar to their United States peers. The different degrees of HPV vaccination acceptability between female and male United States college students may be due to different decision-making processes and issues with respect to vaccinating boys and girls (Liddon, et al., 2010). For example, males are not subject to cervical cancer, and even though various types of other diseases can be prevented by the HPV vaccine, such as genital warts, anal, oropharyngeal, and oral cancers (Harper & Paavonen, 2008), males do not recognize HPV vaccines as being personally beneficial (Liddon, et al., 2010).

Whether those explanations could be applied to CIS or not needs further examination. The focus group discussion results further examined this question in Chapter five.

4.5.3 Who should receive HPV vaccine?

Similar to previous research (T. T. C. Kwan, et al., 2009), the introduction of HPV vaccine education materials did not ensure actual knowledge acquisition of HPV vaccine benefits. Aware of HPV infection as a type of sexually transmitted infection, most CIS thought sexually active women, women with multiple sexual partners, should be vaccinated against cervical cancer. Nearly 80% of participants thought that women and girls who have not had never had sex should be vaccinated. Since the FDA recommended that women and girls who have not have sex were the most effective group for HPV vaccination (Centers of Disease Control and Prevention, 2007), CIS were more likely to indentify women who were sexually active and women with multiple sexual partners to be at high risk for HPV infection and thus, they should receive the vaccination. Result from this study continue reflected a general lack of understanding of the mechanism through which HPV vaccination may prevent cervical cancer and mechanism of vaccination among CIS. These results strengthen the argument that only presenting the key information of HPV vaccine for participants was inadequate to educate the college students about HPV vaccination. Through the brief information of HPV vaccination, CIS had difficulty to understanding the complex HPV-cervical cancer relationship supporting previous research (T. T. C. Kwan, et al., 2009).

4.5.4 HPV infection Stigma

As seen in previous research (T. T. C. Kwan, et al., 2009; Tracy T. C. Kwan, Tam, Lee, Chan, & Ngan, 2011; Lee et al., 2007), after HPV related information was given, a

hypothetical HPV infection was perceived by CIS as stigmatizing and detrimental to intimate, family and social relationships. Most CIS thought that HPV vaccination could negatively influence their relationship with their current partner. Participants (66.3%) said their partner would likely suspect infidelity if they received an HPV vaccination. Participants (58.8%) said that their the relationship will likely end if they got HPV infection. Significantly, more female than male CIS thought that HPV infection would influence their romantic relationship and that their families would suspect them of sexual impropriety if they became HPV infected. Consistent with previous research (Juraskova, Bari, O'Brien, & McCaffery, 2011; Maissi E, 2004), recognizing the sexually transmitted nature of HPV, infection was associated with negative psychosocial impact. Similar to the previous research among Chinese women (T. T. C. Kwan, et al., 2009; Lee, et al., 2007; Nguyen, et al., 2012), HPV infection was stigmatized among CIS. This psychosocial impact among Chinese or Asian communities suggests that traditional oriental values still emphasis that women should be modest and chaste (T. T. C. Kwan, et al., 2009). Despite increasing sexual openness in younger generations even, though lifelong monogamy might not be practiced any longer and considered practical among most CIS, the thought of monogamy was still highly valued.

This study is the first to examine CIS health promotion behaviors such as voluntarily submitting to an HPV vaccination. This study also support the need for building a cultural component to the vaccination promotion program. Although present at almost every large higher education institution in the United States, CIS have received limited attention from United States college health researchers (Zhang & Goodson, 2011). Previous studies regarding international students have examined various issues of

acculturation stress and mental health related to social support. However, there has been limited research that examined the health behaviors of CIS influenced by immigration, education and living in another country, and access to the United States health care system—including eligibility to receive public health prevention measures such as the HPV vaccination.

4.6 Limitation and Future Implementation

This study examined participants' intentions about HPV vaccination after the brief education session. No measurements were conducted on CIS' intention about HPV vaccination before the brief education session. Furthermore, based on the assumption that CIS' awareness and knowledge of HPV vaccination is very low, beliefs of HPV infection and HPV vaccine were measured in this study, only after the brief education session. Future studies should further address the influence of education on CIS' vaccination intention and beliefs by measuring intentions and beliefs of HPV vaccination before and after the education session. Since no measurements were conducted on the change of knowledge, intention and beliefs previous to, and after, the education session, the ultimate effectiveness of the education session remains unknown. Thus, future studies should identify effective means of interventions and educational methods for HPV vaccine acceptability among CIS.

Future investigation should not only examine CIS' attitudes and intention of HPV vaccine, but also their behavior patters, especially sexual behavior patters. Studies addressing CIS' sexual behaviors and beliefs, especially as if involves the prevention of STIs seems warranted.

CHAPTER 5. QUALITATIVE PAPER ONE: CHINESE INTERNATIONAL STUDENTS' AWARENESS AND KNOWLEDGE OF HPV INFECTION AND HPV VACCINATION

5.1 Abstract

Despite an increased awareness and knowledge of HPV infection and Human Papillomavirus vaccine among U.S. college students, studies that specifically focused on Chinese international students as a unique ethnic group, especially with respect to HPV vaccine promotion were limited. This study aimed to examine CIS' awareness, knowledge about HPV vaccine, HPV infection and its related diseases. During the summer and fall of 2013, CIS attending a Midwestern research one university in the U.S. were recruited to take part in a qualitative study. A total of 44 CIS participated in the ten small focus group discussion (4-6 people per group). Both discussions and journaling notes were transcribed and analyzed. The results revealed that: CIS exhibited little awareness and knowledge about the HPV vaccine, the cause of cervical cancer and genital warts. CIS lacked formal education regarding HPV vaccination and other types of sexually-related diseases and information. Their sources of information were informal: street advertisements and social websites such as "Renren." This study has extend of the current research of international students' acculturation

experience, and was the first to examine CIS's awareness and knowledge regarding HPV vaccination, cervical cancer and genital warts.

5.2 Introduction

Human Papillomavirus (HPV) is the cause of multiple diseases. High-risk types (e.g., HPV 16, 18, 31, 33, 35, and 45) are associated with cervical cancer, anal and oral phyreageal cancer and their precursor lesions (intraepithelial neoplasia) (Beutner, Reitano, Richwald, Dorothy, & Panel, 1998). Low-risk types of HPV (e.g., HPV 6 and 11) results in genital warts and respiratory infection. Human papillomavirus (HPV) is the most common viral infection of the reproductive tract. The primary route of genital HPV infection is sexual intercourse, both vaginal and anal, however, penetration is not required for transmission, because HPV transmissions occurs by skin to skin contact (Stanley, 2010). Most sexually active men and women acquire HPV infections at early stage of sexual activity, however, only persistent HPV infection may progress to cervical cancer in about five to ten years (Frazer et al., 2006).

Currently, there are two types of prophylactic HPV vaccines: the quadrivalent HPV vaccine GARDASIL® (Merck & Company, United States) and the bivalent vaccine Cervarix® (GlaxoSmithKline, Belgium) (Morbidity and Mortality Weekly Report, 2007). Gardasil is a quadrivalent vaccine that targets the HPV strains responsible for approximately 70% of cervical cancers and 90% of genital warts (Roden, Ling, & Wu, 2004). Since 2006, the vaccine GARDASIL® has been licensed for females aged 9–26. On September 9, 2009, the U.S. Food and Drug Administration's Vaccines and Related Biological Advisory Committee recommended that GARDASIL® be licensed for males

aged 9–26 for the prevention of genital warts (HPV types 6 and 11) (Centers for Disease Control and Prevention, 2011b).

Cervical cancer is by far the most common HPV-related disease. Worldwide, cervical cancer was the second most common cancer of women, and the fifty deadliest cancer in women. In developing countries, cervical cancer is the most common cancer among women, and China accounts for 14% of the world's annual incidence of cervical cancer (Hu, et al., 2011), and each year 30, 000 deaths result from approximately 100,000 cases of cervical cancer (Parkin et al., 2005). Still, there is increasing cervical cancer incidence among young Chinese women due to increasing risk factors for persistent HPV infection, such as early first sexual intercourse, multiple sexual partners, and immune suppression (Hu, et al., 2011).

However, there had been a lack of access to screening tests for cervical cancer among young, unmarried women in China (Agosti & Goldie, 2007). There were multiple reasons: first of all, there was no national screening programs. Most of the tests were opportunistic screening tests which are conducted when women visit gynecological physicians (Li, et al., 2011). Also, there exists a cultural value of avoiding sexual behavior prior to marriage (Agosti & Goldie, 2007). Younger, unmarried Chinese women were traditionally perceived as avoiding sexual behaviors prior to marriage. Thus, they were often omitted from the company or governmental initiated health examinations or community routine health examinations (Agosti & Goldie, 2007). Facing the lack of access to cervical cancer screening tests, HPV vaccination is a significant effective primary cervical cancer prevention method.

Currently, most European countries and the south and north America Countries have national programs of HPV vaccination. However, with the exception of Hong Kong and Taiwan area, HPV vaccine is not licensed in mainland China (China Cancer Foundation, 2014). Since 2012, there has been global effect of promoting HPV vaccine by WHO and Gavi, the Vaccine Alliance, many of the poorest countries in the world had began HPV vaccine pilot or national programs (Cervical Cancer Action, February 2014).

Along with globalization, increasing numbers of students have migrated to the United States to pursue degrees in higher education. In the 2012–2013 academic year, 235,597 Chinese international students (henceforth referred to as CIS) were studying in the United States, accounting for 28.7% of the total number of international students and about 1% of the total number of US students. This huge subset of ethnic minority students has become an important focus group for health interventions." When CIS migrated to the US, they experienced many common types of acculturation - related stresses, including academic concerns, language difficulties, lack of social support, poor social integration, difficulties in adjusting to new foods or cultural values, perceived discrimination, homesickness, and psychological syndromes such as depression (Wang & Mallinckrodt, 2006; Wei, et al., 2007; Yeh & Inose, 2003). Still, there was limited research focusing on their sexual behavior related health outcomes. As such, little is known about their awareness and knowledge of HPV infection and vaccination. The purpose of this study was to examine CIS' awareness and knowledge regarding HPV vaccination, cervical cancer and genital warts. It was the first such study extending the current research of CIS' acculturation experience.

5.3 Methods

5.3.1 Participants recruitment

The focus group-recruiting email (Appendix E) was sent to all of the CIS in a large research one Midwestern university utilizing a list from the offices of the registrar. The focus group recruiting email included information about the purpose of study, the duration of the group discussion, the confidentiality of the discussion, and information that the discussion will be audio recorded. It also informed CIS that they could participate in the group discussion even if they had completed the online survey, and that a monetary incentive would be offered for participating in the group discussion. In addition, the email also reminded the potential participants that they could withdraw from the discussion at any time. Using a convenient sampling method, participants were also recruited through the University Chinese Student Association, online chat rooms, and the Chinese student network websites.

5.3.2 Data Collection

Participants who consented to participate in the focus group met the following inclusion criteria: 18 years old, born in mainland China, holding F1 visa status and studying at a higher education institution. Students interested in participating in the focus group discussion emailed their approval to the investigators. A time and place convenient and agreeable to all participants was selected. Participants were separated by sex into small groups of four to six and were subsequently scheduled for focus group discussion. Based on the complexity of the research questions, the four to six person small group size allowed for more intimate discussion of the issues and recognized the socio-cultural and

gender dynamics among participants. This size was consistent with previous research among Chinese undergraduate nursing students in Taiwan (Chan et al., 2011).

Before starting the focus group discussions, participants signed a consent form (Appendix F) and completed a short demographic survey (Appendix A) about their age, sex, year in college, length of stay in the US, religious preference, health insurance status and whether they have had taken a class on human sexuality. Participants were also reassured that they need not worry about any comments having negative repercussions, and that they had the freedom to withdraw from the study at any time. It was again reiterated to participants that the discussions were confidential and voluntary and they were to use pseudonyms - "A," "B," "C," "D," "E," and "F", which were assigned to group members in the discussions (Appendix G). Through the discussion, group members were encouraged to call each other by their pseudonyms. All discussions were conducted in the Chinese language (Mandarin) to ensure participants could express themselves clearly and comfortably. Before the discussion, the facilitator, a CIS herself, explained the study aims in Mandarin language to the participants and her role in the study, along with her academic and research background to further build trust and establish rapport with participants. She also informed the participants about her background as a practicing gynecologist in China, as well as her status as a PhD student in health promotion and disease prevention at the university—one who had taught multiple courses related to sexual health.

A total of ten focus groups were conducted consisting of five male and five female focus groups. Participants' concerns about whether they needed to have knowledge about HPV vaccine to participate in the focus group were allayed by the

investigator. Discussions lasted an average of 90 minutes and were audio recorded. A financial reward of 15 dollars were provided to focus group participants to compensate their time.

Two specific data collection procedures were used: (a) focus group discussion, and (b) reflective journaling. Focus groups have been used to 'give a voice' to marginalized populations such as ethnic minorities, the poor, and people affected by stigmatized illnesses such as HIV/AIDS (Liamputtong 2007; 2010). These groups enable researchers, policy makers, and others to 'listen' to people who may otherwise have little chance to express their viewpoints about their health and other needs (Liamputtong 2007; 2010; Madriz 1998; 2003). The focus groups' questions were adapted from a previous study among undergraduate nursing students in Hong Kong (Chan, et al., 2011). The questions were semi-constructed, open-ended and addressed people's knowledge and beliefs about HPV infection and HPV vaccination. There were a total of eight questions: 1) "What do you know about cervical cancer?" 2) "What do you know about genital warts?" 3) "What do you know about the HPV vaccine?" 4) "How do you feel about having an HPV vaccination?" 5) "What were your concerns about having an HPV vaccination?" 6) "If you want to have the vaccine, what will others think about this decision?" 7) "How do you feel about recommending the HPV vaccine to others?" 8) "What do you think of someone who contracts an HPV infection?"

The focus group discussion also followed a three-phase format: 1) discussion of knowledge using the first three questions as guide; 2) information session about HPV vaccine (Appendix H); and 3) follow-up discussion using the last 5 questions. As seen from the above questions, the first three questions explored the awareness and knowledge

of HPV infection and HPV vaccination. The information section which provided a basic level of knowledge of the HPV vaccine was important as it served the purpose of facilitating the third phase of the discussion. The last 5 questions explored beliefs and perceptions about HPV infection and vaccine.

The use of a reflective journal added rigor to the qualitative inquiry enabling the investigator to record his/her reactions, assumptions, expectations and biases about the research process (Morrow and Smith, 2000). Journaling notes described the data collection process and noted observations of the participants and their interactions, and allowed the researcher to assess personal feelings and reactions about conducting research in this area of study. As such, journaling was a way to 'keep the researcher honest, but also a way to constantly question the values and meanings that are articulated by the researcher in the process.

5.3.3 Qualitative Data Analysis

According to Charmaz (2006), constructivist ground theory lies squarely within the interpretive approach to qualitative research with flexible guidelines, a focus on theory developed that depends on the researcher's view, learning about the experience with embedded, hidden networks, situations, and relationships, and making visible hierarchies of power, communication and opportunity. Given the exploratory nature of examining CIS' awareness and knowledge of HPV infection and HPV vaccine, constructivist grounded theory was a well-suited method of analysis as it created meaning from participants' interpretations and perceptions of knowledge while acknowledging the cultural context as well as interactions between researchers and participants.

As stated earlier, all focus group discussion were conducted in Mandarin and audio recorded. Audio recordings were transcribed into Chinese first, and then translated into English language. Additionally, the translated English recordings were edited by a native English speaker to assure consistency of the dialogue. All files were saved in a password-protected computer to which only the research team had access. To ensure internal coder reliability, coding was conducted by two coders who were native Chinese speakers and researchers, and both were fluent in English language. Open coding, focused coding, and selective-coding procedures were used to construct the themes and the results of CIS's awareness and knowledge of cervical cancer, genital warts, HPV infection and HPV vaccine. Data analysis started with open coding to identify different disease concepts that could be easily labeled and sorted. Explanations from the participants were used to create the body of concepts. Concept examples and explanations that fell under the same category were then grouped as agreed upon by the two coders. Constant comparison technique was then used to contrast and compare emerging concepts and categories (Strauss, 1990). Subsequently, axial coding was used to locate patterns and define relationships between the categories. Several categories were collapsed during this process due to their conceptual similarities. For example, concepts such as "secret diseases" and "dirty diseases" were placed under the category of "What is genital warts?" (Table 10).

5.3.4 Maintaining Rigor

The rigor of the qualitative study was established by truthfully reflecting the opinions and perceptions of all participants to accurately identify CIS's awareness and knowledge of HPV infection and HPV vaccine. Credibility for this study was achieved

using the validation strategies of member checking, thick rich description, and researcher reflexivity. As suggested by Lincoln and Guba (1985), multiple member checks with the data analysis were conducted throughout the interviews to clarify participants' experiences and meanings of such experiences by the interviewer. Translations were double checked by another translator to ensure that they were verbatim translations of participants words and ideas. Participants' own words were used throughout the process of data analysis. According to the evaluative criteria of qualitative data analysis, to ensure objectivity, which refers how meanings are generated and conclusions verified, it was essential that the study's findings were a result of participants' experiences and ideas, rather than reflecting the preferences of the researcher (Miles & Huberman, 1994). Co-construction allowed for the salient presence of the investigator in the data by interweaving reflexive journaling with community voices to create dialogue. At the same time, the investigator tried to express the thoughts, opinions, and ideas of the participants without adding her own subjectivity. As the instrument of the research, the investigators were active participants in the conversation and tried to reach a mutual understanding with the participants. To establish trust, as mentioned before, the facilitator introduced her role as both health researcher and sex educator at the beginning of the study. To ensure consistency in the data collection, strict and detailed interview protocols were developed and followed in the group discussion.

5.4 Results

For key themes and the subthemes evolved from the data analysis: Theme 1: Misconceptions of cervical cancer; Theme 2: Genital warts = "secret disease"; Theme 3:

Lack of formal information sources; Theme 4: Confusion about HPV vaccine and breast cancer.

5.4.1 Participants.

Forty four (44) CIS participated in the focus group discussions. Participants' age ranged from 18 to 34 years, with a mean age of 24.6 years, (SD=3.49); Twenty three were female; 21 were male; 13 (29.5%) were undergraduate students; and 31 (70.5%) were graduate students. Participants' years of living in the United States ranged from 1 to 9, with 54.6% of them living in the United States for less than 2 years. Of the participants, 21 (47.7%) had previously taken a sexuality class, 16 (36.4%) of them had not, and 7 (15.9%) did not know.

5.4.2 Theme One: Misconceptions of cervical cancer

Where is the "cervix"

Most participants (both male and female) had heard of cervical cancer. However, some did not fully understand it; they believed it to be similar to other cancers. Few participants knew that "*Cervical cancer is cancer on the cervix*"; and some did not know the location of the cervix. As participant E5, a 20-year-old undergraduate student said while looking downward: "*It's underneath*." Of those who could identify the location of cervical cancer, participant C4 said: "*Cervix is an organ?! It can grow tumors on it, and it's cancerous, thus it's cancer*." Participant F4 said: "*Is it on the uterus? The neck of the uterus, why it's called cervix? When something is wrong then it becomes cancer*." Some female participants mistook cervical cancer for other gynecological problems, such as

cervical inflammation, and correlated it with uterine or ovarian cancer. As participant C2 (a 24-year-old graduate student) said: "*My mother got uterus fibrosis, it was said to be benign, and it healed after a surgery. Is that related to cervical cancer*?"

Many male participants said they had heard of cervical cancer from advertisements such as those in magazines, on television, and on bus posters. Male participants noted that they were not supposed to know much about cervical cancer because they were men and it was traditionally embarrassing for men know much about female diseases. Participant C6 (a 23-year-old male undergraduate) said: "*You cannot have children if you had cervical cancer, right? Not quite sure about the cervical cancerand the breast cancer, you know we are guys (laughing).*" Male participants exhibited shyness when talking about female diseases, believing that they were not supposed to know about such things. There were male participants who talked about some of the outcomes of cervical cancer. Participant A9 (a 27-year-old male graduate student) said: "*I think it surely will lead to infertility. Why? It surely will. Just imagine. (Why?) (Laugh from other participants). It is part of the female reproductive system. Thus, if there is something wrong, it surely affects the fertility*."

Misunderstanding the cause of cervical cancer

There were different opinions between female and male participants regarding the causes of cervical cancer and only a few of them clearly identified HPV as one of those causes.

Along with their awareness of cervical cancer, some female participants thought abnormal reproductive events could be related to cervical cancer. Participants of Group 4, who discussed the relationship of childbirth and cervical cancer, surmised that maybe

women who did not recover well from childbirth could develop this condition. They wondered whether abortion and miscarriage could cause cervical cancer. At the same time, participants were confused about the concept of the terms "*Duo Tai*"(abortion) and "*Liu Chan*"(miscarriage) because in China, "*Liu Cha*n" could also refers to "*abortion*."

Other participants thought cervical cancer was related to the stress and pressure of women's lives. For example, a 22-year-old female graduate student participant stated, "*My mother got uterus fibrosis, it was benign, and it healed after a surgery. Is that related to cervical cancer*?"Female participant F4 (a 25-year-old graduate student) said it was related to a woman's age: "*Is it true that older women are more likely to get cervical cancer? The older you are, the more likely you are to get sick, so a higher incidence?"*

Surprisingly, male participants were more enthusiastic than female participants in explaining the cause of cervical cancer. They provided a variety of opinions such as: cancer is an opportunistic event, cancer is a natural path of aging, and that lifestyle choices, such as drinking and smoking, genetic factors, or toxic materials in the environment could affect one's chance of developing cancer. Participant A6, (a 23-year-old male graduate student) linked it to women' menstruation, remarking: " *Is it (cervical cancer) related to necrosis of the uterus? I know, the inner membrane of the uterus falling down (as the period of women), then the dead part (the inner membrane) could become cancerous. It seems to be like this. I don't know*."

For example, the discussion in the males' focus group discussion (No6) indicated how unsure they were about the cause of cervical cancer:

> B6: "I think cancer is something raised from your own body, it is...(D6: It happened from the inside instead of the outside of your body.) There might be "bad" genes, genes that are located in the cervix. When the "bad" genes are activated, then cancer will grow at that place. I understand it like this: if you got cancer, then you got bad luck."
>
> C6: "I think cancer is a change of the cells, from normal cells into sick cells. This change is not caused by a virus or something, it is a sickness by your own cells. Those sick cells could reproduce themselves infinitely. That they could push out the healthy cells by growing in the wrong place."
>
> D6: "I heard that cervical cancer is different from other cancers. It is caused by one type of virus, not everyone who got infected will get the disease, but their chances are very high. I think it's like the relationship between smoking and lung cancer." (Participant D6 whose mother was a gynecologist in China, said that he went to academic seminars with his mother and learned a lot about HPV vaccination.)

Participants offered numerous opinions regarding causes of cervical cancer. Another group of participants thought bacterial infections related to unclean sex led to cervical cancer. Participant C7 (a 26-year-old male graduate student) mentioned: "*I remember it is caused by Staphyloccocus aureus!*" He told the group that all his knowledge about cervical cancer came from "Wikipedia." When there is something he doesn't know, he checks it out in "Wikipedia". His group members had the following reactions:

A7: “Cool!” (surprised that C7 knew the name of the bacteria and he actually was interested enough to look up this disease.)

B7: “Isn’t it because of the dirty?”C7: “Sure it is!”

B7: “Not a safe and clean sex life.”

D7: “I think an unclean sex life is only one of the causes, the bacteria is the direct cause?”

B7: “During unclean sex life, the Staphyloccocus aureus might be there and get involved.”

A7: “Personal Hygiene (is the cause of cervical cancer)! If you have very bad hygiene (you will get cancer).”

It became evident that both female and male students linked cervical cancer with hygiene practices during sexual behavior.

5.4.3 Theme Two: Genital warts = “secret disease”

“Secret disease” -“Xing Bing (STD)”.

Participants recognized genital warts as a type of “secret disease”-“Xing Bing (STD)”. More male than female participants were aware of genital warts as a type of STD. Interestingly, both male and female participants thought only men could contract this disease. As participant B2 said: *“Genital warts, I always thought it’s a disease only in men. I don’t know. I think it’s related to the genital organs. I don’t know much details.”*

Participants did not display much knowledge about this disease except for very obscure images and impressions. Most participants stated that they were unaware of the symptoms of genital warts. Because of the stigma attached to the disease, people usually would not talk about it the way they would other illnesses

such as lung cancer and stomach diseases. Because of this tendency to hide it, participants said they were unable to learn much about genital warts. Participant B2 said, "*You don't know it if you have not seen it! If you have no friends who got this disease before, or you haven't had this disease before, you hardly learn about diseases like this.*" A few male participants said that it might affect the skin as rashes or something like that. Still, Chinese international students did not perceive this as a common disease that they have heard about during their lifetime.

"Dirty Girl"

Participants discussed the cause of genital warts, as it was recognized as a type of "*Xing Bing,*" the discussion followed the direction that promiscuous sexual behavior is the cause of the disease. Participants said that in the large cities of China, young people were very open minded and tended to have multiple sexual partners. As female participant C3 said: "*Lan jiao! (Promiscuous sex behaviors!) I heard that in some big cities, people have multiple sexual partners, A with (has sex with) B, B with C, that A and C were normal, but when A had sex with B, and B had sex with C, then they all get sick.*"

Male participants moved their bodies forward (the chairs they sat in were movable) when they spoke about the cause of genital warts. Some of them said the disease could be caused by small organisms such as virus, bacteria, fungus, and parasites living in the skin. Surprisingly, male participants mentioned the concept of the "dirty girl," a term traditionally used to describe a woman who is a sex worker or who sleeps with multiple men. The discussion of the male students in Group six further exemplified this:

A6: "Not paying attention to hygiene (is the cause of genital warts)."

C6: “Sexual disease is contamination by some dirty stuff.”

B6: “I think it’s bacteria, you know skin is the first barrier to keep you healthy, and there is no skin in the female genital area, right? Based on what I heard of before, that place (genital area) was more likely to get sick because it is not covered by skin. Thus, the bacteria could just get in and cause the bacterial infection. It’s easier for the virus to get inside. I think the air is full of bacteria, there are live ones and dead ones. You could not see them. Then you get sick from the infection.”

C6: “I think it’s the dirty stuff that you have sex with the dirty “Girl!” (laughing from the rest of the group, when they heard the “dirty girl”!) The physical contact, the unwashed underwear, I don’t know, these things you know.”

A6: “I think it’s related to your endocrine and reproductive system, the environment is complicated. Your bodily fluid could secrete hormones (reregulated). When the environment have some bugs, it could get inside your body and cause the diseases.”

Participants were not clear on the cause for genital warts; they interpreted the cause of genital warts following the perception that it is a type of STI. It is postulated by the researcher that participants thought their answers could be the causes of all kinds of STIs with which they might be familiar.

5.4.4 Theme Three: Lack of formal information sources

Heard of Genital Warts and other STIs from Informal Street Advertisements

Most participants had not heard of genital warts. When asked about the name, both male and female participants who had heard of it immediately related

the name with the small advertisement posted on street electric poles: "*It (the genital warts treatment advertisement) is on the electric poles!*" Some participants mentioned that they also learned of it from free magazines and fliers in the bus, and free handouts in the street. Male participants were excited and laughed when they talked about genital warts. They also joked about the "*Old traditional medicine doctors*," since it was those traditional medicine doctors who posted small ads and provided treatment to "*secret disease*" (usually the diseases related to the sex). The mention of genital warts led both female and male students to note other STIs they had heard of, such as syphilis, gonorrhea, and HIV/AIDS.

Heard of HPV vaccine from female friends, online social networks and during physical examination in the U.S.

Most participants said they had not heard of HPV or HPV vaccine before this study. Among the female participants who had heard of HPV and the vaccine, some mentioned that hospitals, the Internet, and friends were the major sources for their information. One female participant said that the nurses at the campus hospital in the United States had recommended the vaccine to her. Another, participant C3, said she remembered the name while she was in the hospital in China, she said: "*I read it on the poster of the hospital wall. I think it was about the introduction of HPV virus. But I don't know what it is about, the vaccine, or something, but I remember this word, and I discussed it with my friends. The Chinese hospital had the information like this.*"

Besides the hospitals, online social networking websites were cited by participants as the most frequent sources for information about HPV vaccine. Several

said they had read about HPV vaccine from the shared links on the "*Renren*" website, which is a Chinese version of "*Facebook*." On the website, people who received the HPV vaccine shared their experience of vaccination and introduced the HPV vaccine on their homepage. As participant A1 (a 19-year-old freshman who went to both high school and university in the United States) said: "*I read this information on Renren, my friend shared a article regarding HPV vaccine, and a lot of my others friends commented on that link and that's why I am interested in this research project.*" One participant mentioned he had heard the name before and just "Googled" it to learn more.

Many female participants confirmed that they had heard of the HPV vaccine from their girlfriends who had already received it or planned to be vaccinated. As participant B1 (a 27-year-old graduate student) mentioned: "*After you contacted me for this interview, I remembered that one of my friends actually called me to get the vaccine. She called me to go with her. But you know, I don't know much about it, and she just mentioned it. I am afraid of the injection, thus I did not go. Probably because I did not know much about it.*" Female participant C3made a similar remark: "*I have a friend who is living in Hong Kong. I heard that people could get HPV vaccine there. It is very expensive but there is a trend toward getting the HPV vaccination. I heard that a lot of women follow the trend. A lot of girls from mainland China went to Hong Kong just for the vaccination. But I don't know the details. I heard that it's only 15 dollars in PUSH [the University students health center], or almost free. I don't know. She (the friend) was washing dishes and I was cooking, thus we just chatted about it.*" Noticing

that it is true that CIS could get HPV vaccine for free in the student health center, participants were very surprised to learn that they could get access to the vaccine on campus for free with their student insurance.

Only three male participants had heard of the HPV vaccine: One learned of it from his physician mother's work place, the other two had heard about it from their female friends. As participant D6 mentioned: "*I have two female classmates who received the HPV vaccination here. They told me that males could also get the vaccine, and it could prevent genital warts. The girls who told me that it was suggested to all guys to get the HPV vaccination. It's free*." But the participant D6 said that since he did not know much about this vaccine he did nothing after he heard about it.

5.4.5 Theme Four: Confusion about HPV and breast cancer.

Participants confused the concept of HPV with several other diseases. For example, participants wondered if HPV was related to breast cancer. Since there were two characteristics of the Chinese translation of HPV—"*Ru Tou*," which means "*nipple*" in Chinese (The new version of translation in Hong Kong used "*Ru Tu*" (*'nipple like'*) to avoid confusion). As participant B6 (a 24- year-old male graduate student) said: "*Why is the name papilloma virus? Does it come from the nipple?* (Facilitator shook her head to indicate 'no'.)" Hearing this, the rest of the group members' reaction was also interesting, as indicated below:

C6 said: "Not related to nipple?"

Facilitator: "No"

C6: "By looking at that name, I thought when a nipple touched a nipple, the virus was transmitted. I am serious!"

Similar discussions occurred in Group 2; participants thought that HPV vaccine was for preventing breast cancer:

C2: “As I know, you need three injections, it is best to get injected before a certain age, I don’t know much more. What it prevents, I don’t know. I thought it is for breast cancer, but later found out that it is not for breast cancer.”

B2. “Yes, heard a lot about breast cancer, not heard of this.”

I2: “Why do you think it is for breast cancer?”

C2: “I guess, I don’t know what it is, I think it much more likely to be for breast cancer, but I don’t know. I think it is a virus prevention vaccine.”

A2: “I think the same as her, but here it says the nipple, breast cancer seems to be much deeper, the nipple just the nipple, thus it seems that it is just for that.”

5.5 Discussion

There was a lack of formal sex education and formal information sources about HPV infection, HPV vaccine and other STIs among the CIS. Furthermore, without professional input, there was a high probability of acquiring false information and guidance. For example, female CIS were more likely to link gynecological diseases such as fibrosis tumors and cervical inflammation with cervical cancer. Female CIS also mentioned that multiple childbirth, miscarriage, and abortion might be the cause for cervical cancer.

Chinese culture also had a significant influence on CIS’s interpretation of the infection and diseases. Both male and female participants mentioned various reasons for cervical cancer, such as aging, genetics, and the influences of lifestyle and environment, especially “bad hygiene.” It was not surprising that there was a time in history (still

currently in certain areas of China), that people did not have access to clean showers (Zhao et al., 2012). Thus, people tended to think that infections were related to not being able to take a shower before and after sexual behaviors, and that the infections were the causes of the diseases. Also, the presence of social media's recommendations and advertisements of genital hygiene products might make people assume that genital infections and diseases could be caused by bad hygiene.

As revealed in this study, CIS' awareness and knowledge of HPV vaccine relied on oral conversations with their friends and people who were close to them, from social websites and street advertisements. However, ethnic group social media networks (Chinese version of "Face Book") should be used carefully and properly for sex education and HPV vaccine promotion. CIS who were aware of HPV and HPV vaccination said that online network websites such as "Renren" and girlfriends were the major sources of information from which they learned of HPV vaccine and other people's vaccination experiences. This finding was confirmed by a previous study among CIS which suggested that online ethnic social groups (since "Renren" is Chinese version of "Facebook") and traditional interpersonal networks were major support networks in the cross-cultural adaption of CIS in United States (Ye, 2006). According to Ye, online communication was very common among CIS who share the similar experience of living and studying in a new cultural environment. However, people were not requested to disclose their real identities, thus, people could discuss a variety of topics. In this case, the same ethnic social websites could be a unique but also effective way of promoting HPV vaccine. Some female participants also mentioned that they learned that the HPV vaccine, although not offered in mainland China, was available in Hong Kong, which had

been confirmed by previous research. The advertisement of HPV vaccine in Hong Kong had attracted many Mainland Chinese customers (Kwan, et al, 2011).

CIS's impressions regarding the disease genital warts came from street advertisements and traditional interpretations of it as a type of "dirty" disease. As in traditional culture, they identified this kind of disease as a "*Secret disease*," and therefore embarrassing to mention or discuss in public (Tung, et al. 2012). After the 1949 Chinese Revolution, which lasted into the 1950s, sexually transmitted diseases (STDs) were successfully controlled. By the time an international conference on sexology was held in 1964, the Chinese government claimed that STDs had disappeared from China (Evans, 1997). The situation changed rapidly when China opened its doors to the world. Since 1980s, STDs have spread to every province and all the major cities in China. According to Liu and colleagues (1997), stigmatization was an important factor in STI prevention and control. Thus, there were many private clinics which advertised their illegal practice by using paper posters on the utility poles of the streets. Due to the recent prevalence of STIs in China, the advertisement of STIs treatment had became legal, and there were numerous advertisements appearing in diverse social medias. As a result, social media was the only resource mentioned by the participants as the source of their exposure to information about STIs. Again, there is a demand for formal sex education to correct people's misunderstanding of the diseases and promote healthy lifestyles.

5.6 Limitation and Future Implementation

The study was conducted at a large research one Midwest university; these results might not represent other regions or universities in the US. Furthermore, the results of this study cannot be extended to Chinese immigrants who are not registered at the University, since their living environment might be quite different from the CIS, with regard to living accommodation and health insurance.

The HPV vaccine should be promoted as an important component of the formal education offered to CIS. Future studies should examine sexual behaviors and STI prevention behaviors among CIS. Safe sexual behavior and general sexuality education should be promoted among CIS. Cultural competence should also be taken into consideration when similar studies are conducted among CIS. For example, when promoting HPV vaccine among Chinese populations advertisement of the name and function of the vaccine should be included. Education regarding HPV infection related diseases should be included with vaccine promotion. As male CIS seem to perceive HPV vaccine as primarily “girls’ vaccine” (Marlow, Waller, Evans, & Wardle, 2009) in the US, there is a need for sex education and HPV promotion among male CIS as well.

CHAPTER 6. QUALITATIVE PAPER TWO: CHINESE INTERNATIONAL STUDENT'S BELIEFS AND INTENTION OF HPV VACCINATION

6.1 Abstract

The Human Papillomavirus (HPV) vaccine provides an effective prevention strategy against HPV infection, cervical cancer, and genital warts. While the HPV vaccine is being promoting in developing countries, the acceptance level of young Chinese adults is unknown. The purpose of this study was to examine beliefs and intentions about HPV infection and vaccination among Chinese international students (CIS) living and studying in the United States. Ten focus groups were conducted with CIS aged 18-34 (mean=24.6) in a large Midwestern United States university in the fall of 2013. Each group was comprised 4-6 participants with a total sample of 44 CIS. The discussions were audio taped, transcribed and analyzed. CIS discussed their intentions regarding HPV vaccination; how they might discuss HPV vaccination with their partners, friends, and family members; their varied perceived stigma related to HPV infection, and how they might react if their partners became HPV infected. This study extended the research of current perceptions of STI and HPV vaccination among Chinese women, and drew a picture of current influences on young Chinese adults who live abroad especially with respect to their values concerning relationships, social support, and cultural identity.

6.2 Introduction

Together with globalization, the growth of the knowledge-based economy has led to an increased demand for higher education (Kritz, 2006). For decades, increasing numbers of students have migrated to the United States to pursue degrees in higher education. Those international students constitute an important cohort in U.S. colleges and universities (Kritz, 2006). Since the 2008-2009 academic year, China has been the number one country of origin for these international students. In the 2011–2012 academic year, 194,029 Chinese international students (CIS) were studying in the United States, accounting for 25.4% of the total number of international students, up from 23.1% the previous year (Institute of International Education, 2012b).

Yet despite their visible presence at almost every large institute of higher education in the United States, CIS have received limited attention from U.S. college health researchers (Zhang & Goodson, 2011). Living and studying in United States as international students, CIS have become an important focus group of public health education and intervention efforts to prevent sexually transmitted infections (STI), specifically Human Papillomavirus (HPV), and the diseases related to the infection. From a public health perspective, there is a need to determine CIS' perception and beliefs about HPV infection and vaccination, as well as whether or not they intend to receive the HPV vaccination.

6.2.1 CIS health behavior acculturation.

International students are defined as non-immigrant, foreign students in the United States on temporary visas studying at the postsecondary level (Institute of International Education, 2012a). Most international students plan to eventually return to

their home countries. While they have their own cultural backgrounds, these students experience acculturation while studying in the United States (Ye, 2006). Acculturation is a term that was originally proposed by anthropologists to refer to group-level phenomena involving change that results from contact between two different cultures (Redfield et al., 1936). More specifically, acculturation is defined as the amount of culture-related values, beliefs, affects, customs, and behaviors that are norms of the majority/host culture that are adapted or endorsed by a minority/immigrant individual (Ward, 1996). Previous researchers have consistently indicated that Asian (including Chinese) international students experience more stress related to acculturation than European international students because their backgrounds differ more from that of Americans than their European counterparts (Sumer, 2009). According to Wang and Mallinckrodt (2006), most CIS are likely to encounter considerable acculturative stress because of the differences in academic and social norms between Chinese and U.S. culture. Inherent in Chinese culture, CIS generally hold beliefs about the virtues of humbleness, emotional restraint, self-effacement, and saving face. CIS are likely to have difficulties fitting in with an American style of social conversation, and are less likely to express their feelings, assert expressions of their own opinions, or share personal information (Wang & Mallinckrodt, 2006). Many common types of acculturation-related stress that CIS face when coming to study in the United States include academic concerns, language difficulties, lack of social support, poor social integration, difficulties in adjusting to new foods or cultural

values, perceived discrimination, homesickness, and psychology syndromes such as depression (Wang & Mallinckrodt, 2006; Wei et al., 2007; Yeh & Inose, 2003).

Previous research also showed that Asian immigrants' sexual attitudes and behaviors could have been acculturated to the local culture. Several studies of Asian immigrants in Canada indicated that long-term residents tended to adopt sexual practices similar to those of the mainstream culture (Meston, Trapnell, & Corzalka, 1998). Asian immigrants in Canada indicated that long-term residents had more "Western" or "liberal" sexual attitudes than residents who recently immigrated. Furthermore, the degree of influence of sexual behavior differed according to gender. Longer-term resident Asian-American women were more likely to engage in sexual behaviors; however, Asian-American men seemed to be less affected by their term of residence (Meston, et al., 1998). Meston and Ahrold's (2010) research among 1, 419 U.S. undergraduate students suggested that although there were no significant effects of acculturation on the range of sexual experiences in Asian men, these effects of acculturation were significant with respect to the casual sexual behavior of Asian women (Meston & Ahrold, 2008). Exposed under American Culture, it is unknown how CIS who are living and studying in the United States perceive sexual behavior, Sexually Transmitted Infections (STI) and STI prevention.

6.2.2 HPV infection and HPV vaccine in China.

Cervical cancer is the second leading cancer among women worldwide, and over 85% of cases occur in developing countries (Ferlay et al., 2010). The People's Republic of China accounts for 14% of the world's annual incidence of cervical cancer (Hu et al., 2011). Each year, 30,000 deaths are reported from approximately 100,000 cases of

cervical cancer (Parkin et al., 2005). The number of occurrences of HPV infections (Hu, et al., 2011) and cervical cancer among young Chinese women is rising, which makes them an important focus group for cancer prevention strategies (Zhao, Hu, Zhang, Chen, & Qiao, 2010). However, there has been a lack of access to screening tests for cervical cancer among young, unmarried women in China (Agosti & Goldie, 2007). There is an urgent need among the young women of China and other developing countries for vaccination (Agosti & Goldie, 2007).

The Human Papillomavirus (HPV) vaccine provides an effective strategy against HPV infection, cervical cancer, and genital warts. Currently, there are two types of prophylactic HPV vaccines: the quadrivalent HPV vaccine (GARDASIL®, Merck & Company, United States) and the bivalent vaccine Cervarix® (GlaxoSmithKline, Belgium) (Morbidity and Mortality Weekly Report, 2007). Since 2006, the vaccine GARDASIL® has been licensed for females aged 9–26. On September 9, 2009, the U.S. Food and Drug Administration's Vaccines and Related Biological Advisory Committee recommended that GARDASIL® be licensed for males aged 9–26 for the prevention of genital warts (HPV types 6 and 11).Though the pharmaceutical companies of both vaccines mentioned above are conducting clinical trials in China, they have yet to be approved by the Chinese State Food and Drug Administration (mainland China) (China Cancer Foundation, 2013). As such, the vaccines are not available in mainland China, except Hong Kong and Taiwan area.

6.2.3 Chinese women's belief and perception of HPV vaccine

Though HPV vaccine is not available in the market in mainland China, after after receiving education about HPV vaccines, the majority of Chinese women (84.6%) in mainland China, were willing to be vaccinated because of their fear of HPV infection and genital warts. The primary reason for unwillingness to be vaccinated was doubt regarding the source of the vaccination. Chinese women preferred to acquire vaccinations from the government and medical organizations rather than pharmaceutical companies (Li et al., 2009). Another study among 845 female Taiwanese undergraduate students found that more than 63% of them intended to receive an HPV vaccination. Age, a family history of gynecologic cancer, a personal history of gynecological visits, sexual experience, and awareness of the vaccine were all significant predictors of their intention to receive an HPV vaccination. Also, in Hong Kong, women who believed they were more susceptible to HPV infection, those who considered cervical cancer a severe disease or result of STI, and those who believed the efficacy of HPV vaccines had a higher intention to be vaccinated. There were also external influences on their decision to be vaccinated such as the cost, availability, and a recommendation from a physician (Hsu et al., 2009). Another study in Hong Kong, conducted among adolescent girls aged 13–20 years old, showed that all participants had heard of cervical cancer from the mass media, but none had any knowledge of HPV. After being educated by facilitators, the girls held a favorable attitude toward HPV vaccination; however, they did not believe that vaccination was necessary for them at the moment. Their attitudes and perceived support from family or peers significantly correlated with their intention to be vaccinated and their willingness to accept a preventative intervention. (Kwan et al., 2008). A study among 162 Chinese-

American women recruited from urban community settings in California (aged 18 years and older) conducted by Nguyen and colleagues (2012) indicated that regardless of HPV's STI nature, HPV vaccine acceptance was higher when the cost of the vaccine was not a factor. The women's awareness and acceptance of the HPV vaccination was associated with their insurance status and English proficiency (Nguyen, Chen, & Chan, 2012).

A previous study showed that Chinese culture played a critical role on how Chinese women interpreted the vaccination. According to Kwan and colleagues (2009), Chinese women in Hong Kong stigmatized HPV infection as a type of STI as soon as they learned it was sexually transmitted. Some women, particularly the younger ones, blamed themselves for contracting the infection and sought to keep it a secret in order to protect their reputations. Women with a history of only one partner tended to express anger and blame their sexual partner for the infection. HPV had the potential to affect the families and relationships of Chinese women. Interviews showed that nearly half of the participants perceived an adverse impact on relationships with their partner, family, or friends if they were HPV infected. For 42% of the infected participants, the impact was considered serious enough to end their intimate relationship (Kwan et al., 2009). Chinese women in Taiwan confirmed the perception of stigmatizing HPV infection as a type of STI. In Hong Kong, a focus group study conducted by Lee and colleagues (2007) showed that women were disinclined to accept that HPV could lead to cervical cancer. Also, participants were reluctant to be vaccinated

against a type of STI, they insisted that they did not engage in unsafe sex and were not having sex with anyone other than their trusted partner (Lee et al., 2007).

Although studies have been conducted among Chinese women worldwide regarding HPV vaccination, there is limited research that has investigated the intention and beliefs about HPV vaccination among young Chinese adults studying and living in the United Students as international students. Thus, the purpose of this investigation was to measure: (a) How CIS perceive HPV vaccine? (b) What do CIS believe about HPV infection?

6.3 Methods

6.3.1 Participants recruitment

The focus group-recruiting email (Appendix E) was sent to all of the CIS in a large research one Midwestern university utilizing a list from the university registrar. The focus group recruiting email included information about the purpose of study, the duration of the group discussion, the confidentiality of the discussion, and that the discussion would be audio recorded. It also informed CIS that they could participate in the group discussion even if they had completed the online survey, and that a monetary incentive would be offered for participating in the group discussion. In addition, the email also reminded the potential participants that they had a right to withdraw from the discussion at any time. Using convenient sampling method, participants were also recruited through the University Chinese Student Association, online chat rooms, and Chinese student network websites.

6.3.2 Data Collection

Participants who consented to participate in the focus group met the following inclusion criteria: 18 years or more of age, born in mainland China, holding F1 visa status and studying at a higher education institution. Students interested in participating in the focus group discussion emailed their willingness to participate to investigators. A time and place convenient and agreeable to all participants on campus was selected. Participants were separated by gender into small groups of four to six and scheduled for focus group discussion. Based on the complexity of the research questions, this four to six person small group size allowed for more intimate discussion of the issues and recognition of socio-cultural and gender dynamics among participants. This size was consistent with previous research among Chinese undergraduate nursing students Taiwan (Chan et al., 2011).

Before starting the focus group discussions, participants signed a consent form (Appendix F) and completed a short demographic survey (Appendix A) regarding their age, sex, year in college, length of stay in the US, religious preference, health insurance status and whether they had taken a class on human sexuality. Participants were also reassured that they need not worry about any comments having negative repercussions, and that they had the freedom to withdraw from the study at any time. It was again reiterated to participants that the discussions were confidential and voluntary and they were to use pseudonyms - “A,” “B,” “C,” “D,” “E,” and “F”, which were assigned to group members in the discussions (Appendix G). Through the discussion, group members were encouraged to call each other by their pseudonyms. All discussions were conducted in the Chinese language (Mandarin) to ensure that participants could express themselves

clearly and comfortably. Before the discussion, the facilitator, a CIS herself, explained the study aims in Mandarin language to the participants and describe her role in the study, along with her academic and research background to further build trust and establish rapport with participants. She also informed the participants about her background as a practicing gynecologist in China, as well as her status as a PhD student in health promotion and disease prevention at the university. She further explained that she had taught multiple courses related to sexual health.

A total of ten focus groups were conducted: five male and five female focus groups. Participants' concerns about whether they needed to have knowledge about HPV vaccine to participate in the focus group were allayed by the investigator. Discussions lasted an average of 90 minutes and were audio recorded. A financial reward of 15 dollars was provided to focus group participants to compensate them for their time.

Two specific data collection procedures were used: (a) focus group discussion, and (b) reflective journaling. Focus groups have been used to ‘give a voice’ to marginalized populations such as ethnic minorities, the poor, and people affected by stigmatized illnesses such as HIV/AIDS (Liamputtong 2007; 2010). These groups enable researchers, policy makers, and others to ‘listen’ to people who may otherwise have little chance to express their viewpoints about their health and other needs (Liamputtong 2007; 2010; Madriz 1998; 2003). The focus groups’ questions were adapted from a previous study among undergraduate nursing students in Hong Kong (Chan, et al., 2011). The questions were semi-constructed, open-ended and addressed people’s knowledge and beliefs about HPV infection and HPV vaccination. There were a total of eight questions: 1) “What do you know about cervical cancer?” 2) “What do you know about genital

warts?" 3) "What do you know about HPV vaccine?" 4) "How do you feel about having an HPV vaccination?" 5) "What were your concerns about having an HPV vaccination?" 6) "If you want to have the vaccine, what will others think about this decision?" 7) "How do you feel about recommending the HPV vaccine to others?" 8) "What do you think of someone who contracts an HPV infection?"

The focus group discussion also followed a three-phase format: 1) discussion of knowledge using the first three questions as guide; 2) information session about HPV vaccine (Appendix H); and 3) follow-up discussion about beliefs using the last 5 questions. As seen from the above questions, the first three questions explored the awareness and knowledge of HPV infection and HPV vaccination. The information section provided basic level of knowledge of HPV vaccine. The information session was important as it served the purpose of facilitating the third phase of the discussion. The last 5 questions explored beliefs and perceptions about HPV infection and vaccine. Only the results of the third phase follow-up discussion about beliefs using the last five questions are presented here.

The use of a reflective journal adds rigor to qualitative inquiry enabling the investigator to record his/her reactions, assumptions, expectations and biases about the research process (Morrow and Smith, 2000). Journaling notes described data collection and noted observation of participants and their interactions, and allowed the researcher to assess personal feelings and reactions about conducting research in this area of study. As such, journaling is a way to "keep the researcher honest", but is also a way to constantly question the values and meanings that are articulated by the researcher in the process.

6.3.3 Qualitative Data Analysis

According to Charmaz (2006), constructivist ground theory lies squarely within the interpretive approach to qualitative research with flexible guidelines, a focus on theory developed that depends on the researcher's view, learning about the experience with embedded, hidden networks, situations, and relationships, and making visible hierarchies of power, communication and opportunity. Given the exploratory nature of examining CIS' awareness and knowledge of HPV infection and HPV vaccine, constructivist grounded theory was a well-suited method of analysis as it created meaning of participants' interpretations and perceptions of knowledge while acknowledging the cultural context as well as interactions between researchers and participants.

As stated earlier, all focus group discussions were conducted in Mandarin and audio recorded. Audio recordings were transcribed into Chinese first, and then translated into English language. CIS' statement was then edited by an English speaking native who insured clarity of the responses. All files were saved in a password-protected computer to which only the research team had access. To ensure internal coder reliability, coding was conducted by two coders who were native Chinese speakers and researchers, and both were fluent in English language. Open coding, focused coding, and selective-coding procedures were used to construct the themes and the results of CIS's awareness and knowledge of cervical cancer, genital warts, HPV infection and HPV vaccine. Data analysis started with open coding to identify different disease concepts that could be easily labeled and sorted. Explanations from the participants were used to create the body of concepts. Concept examples and explanations that later fell under the same category were then grouped as agreed upon by the two coders. Constant comparison technique was

then used to contrast and compare emerging concepts and categories (Strauss, 1990). Subsequently, axial coding was used to locate patterns and define relationships between the categories. Several categories were collapsed during this process due to their conceptual similarities. For example, concepts such as “secret diseases” and “dirty diseases” were placed under the category of “What are genital warts?” (Table 10).

6.3.4 Maintaining Rigor

The rigor of the qualitative study was established by truthfully reflecting the opinions and perceptions of all participants to accurately identify CIS’s awareness and knowledge of HPV infection and HPV vaccine. Credibility for this study was achieved using the validation strategies of member checking, thick rich description, and researcher reflexivity. As suggested by Lincoln and Guba (1985), multiple member checks with the data analysis were conducted throughout the interviews to clarify participants’ experiences and meanings of such experiences by the interviewer. Translations were double checked to ensure that a verbatim translation of participants’ words and ideas was captured. Participants’ own words were used throughout the process of data analysis. According to the evaluative criteria of qualitative data analysis, to ensure objectivity, which refers how meanings are generated, and conclusions verified, it is essential that the study’s findings are a result of participants’ experiences and ideas, rather than reflecting the preferences of the researcher (Miles & Huberman, 1994). Co-construction allows for the salient presence of the investigator in the data by interweaving reflexive journaling with community voices to create dialogue. At the same time, the investigators tried to express thoughts, opinions, and ideas of the participants without adding thier own subjectivity. As the instrument of the research, the investigators were actively

participating in the conversation and tried to reach a mutual understanding with the participants. To establish the trust, as mentioned before, the facilitator introduced her role as both health researcher and sex educator at the beginning of the study. To ensure consistency in the data collection, strict and detailed interview protocols were developed and followed in the group discussion.

6.4 Result

Four key themes and the subthemes evolved from the data analysis: Theme One- "Concerns of vaccination": 1) Suitable age for vaccination; 2)Vaccination or not- following a plan of sexual behavior; 3)"They" are the ones who should get the vaccine! Theme Two- "Cultural and Scientific Beliefs about vaccination": 1) When in the United States, do as the Americans do; 2)"Strong science believers"; 3)The Western vaccine is not fit for Chinese. Theme three-Communication of HPV vaccination: 1) With partners; 2) With parents; 3) With friends. Theme four-Perception of HPV infection: 1) Stigma?- HPV infection is different from other STIs; 2) Response of HPV infection.

6.4.1 Participants

Forty four (44) CIS participated in the focus group discussions. Participants' age ranged from 18 to 34 years, with a mean age of 24.6 years, (SD=3.49); Twenty three (23) were female; 21 were male; 13(29.5%) were undergraduate students; and 31(70.5%) were graduate students. Participants' years of living in the United States ranged from 1 to 9, with 54.6% of them living in the United States for less than 2 years. Of the participants, 21(47.7%) had previously taken a sexuality class, 16 (36.4%) of them had not, and 7 (15.9%) did not know.

6.4.2 Theme one: “Concerns of vaccination”

Participants expressed a variety of concerns regarding the HPV vaccine, most of which concerned the general considerations of a new vaccine, such as its safety, pain, side effects, limited coverage, and protection (GARDASIL® only covers 4 subtypes of HPV, and the immunity only lasts a maximum of 5 years). However, CIS also expressed many ideas that were unique to this population.

Suitable age for vaccination.

Both female and male participants wondered why the recommended age for this vaccine was between 9 to 26 years old. Knowing that vaccinations should be given before exposure to the HPV virus and active sexual behavior (an opportunity to conteract the infection), participants disagreed with the suggested minimum and maximum ages. Participants asked if someone older than 26 and a virgin, or who was not sexually active could still receive the vaccine? The conversation among one female group follows:

> B1: (Pointing at the education poster) “ It says here that people aged 9 to 26 years old should get the vaccine, how about people older than 26?”
>
> B1: “So people who are not sexually active yet should get the vaccine, does that mean that once you had sex, you cannot receive the vaccine?”
>
> A1(tried to answer B1’s question): “Because when you have had sex, you probably have got the infection already.”
>
> B1: “Oh, then if you have had sex before, but you haven’t got the infection yet, you still could get the vaccination?”

Participants were also concerned about the minimum recommended age for vaccination. They were surprised that a 9 year old could receive the vaccination, and

were further surprised to learn that a 9-years-old child might already be involved in certain sexual behaviors that might lead to infection. They suggested that in China, the minimum suggested age should be increased because they believe that Chinese children had their first sexual contacts at an older age. There was much discussion regarding whether or not Chinese youth were more open or conservative compared with U.S. youth.

> A1(female, 19 year old freshman undergraduate student who lived in United States for 2.5 years) said: "I think the age, the 9 years old, should be increased, but the upper limit (26 years old) should be kept the same. When international students come here (to United States), we are very open minded about sex, that is true. Some people started having sex pretty early in college, from sophomore year (around 19 years old), or even junior year. I have many undergraduate friends, I heard of many stories. However, 9 years old is too young."

Participants thought that CIS' sexual behavior was affected by their age when they first arrived in the United States. The younger the international students were, the higher the chance that they started sexual behavior of an earlier age. Some senior participants said they were not at risk because they were older Chinese students and were more conservative; they thought that those CIS born in the 1990s might be at risk because their sexual behaviors followed a different pattern. There were different behavior patterns among different CIS age groups. Participants believed, "*The younger ones, they were more open minded (about sex).*" Below is a discussion among three graduate students:

> B3 (female, 23 years old, graduate student): "I think this (how open minded about sex) is related to the age, I think those who are very young, 17 and 18, 19 years old, they were more acculturated (when they came to the United States). They

have not built their own Chinese value system yet. Older people were less likely to be influenced by the environment and people around them."

D3 (female, 23 years old, graduate student): "They (the younger ones) might think they are more connected to the United States than China (they were more westernized). Unlike those who came (to the United States) when they were 25 or 26 (years old), when they came (to the United States), they had already been fully developed as Chinese (holding Chinese values)."

A3(female, 28 years old, graduate student): "(If you are older,) it's hard for you to accept the new things in life."

D3(female, 23 years old, graduate student): "You know, being Chinese, I like Chinese food. When I look at the pizza, the burgers (acting nauseated), I think they are not my things. But when you are talking about rice, I know it's me (my food)."

A similar statement came from a 27 years old male graduate student. He described people who were born in the 1980s as more conservative, less acculturated:

C8 (male, 28 years old, graduate student): "I think Chinese, I don't know much about the younger ones. My generation, the 80s, those who were born before 85, we received more traditional education. We are more conservative, and we are less likely to engage (inunacceptable sexual behavior). People born after 85 (laughing from the rest of the group members, who agreed with him and thought that the younger generation is wild regarding sexual activities), they might need things like this (HPV vaccine). Anyway, I think sex education should be the solution (for the diseases). If you only receive the vaccine, you are still at risk of

other diseases, such as HIV, syphilis, there are so many types! The diseases, the messed up diseases! Thus, we should start with education (sex education). Vaccination is just one way. There are so many doors (toward sickness), you only close one, there are many doors left open. Vaccination is limited when prevent diseases, education (sex education) should be on top of it."

A few participants thought that because the world was so globalized now, there were no differences in sexual behavior between the international students and the college students back in China; they were as open as U.S. college students. As participant D6 (male, 24 years old, graduate student) said:

"I think in China, it is the same (people are very open minded about sex). Not previously; the current China. So many students came abroad, I think they are not different from the college students in China. International students are the same as college students in China. Talking about sex, there are not many differences, the environment is the same, you know the environment for exploring sex. For example, in China, if they want to do something, they could just go and get a room (hotel room, college students in China usually live with many roommates), in United States, you don't need to get a hotel room; you have your own room (your apartment). I mean, there is not much difference, if you think about it, it is the same. International students came to the United States with their mind from China. We came here for a college education, you know, in college, engineering students don't learn anything outside class; you don't get the chance to learn new things. The way you think is the same as in China. You still watch things online in Chinese. I think CIS, you call yourself international students, as

titled, we are not much different from before." (Some of his group members were nodding their heads)

Vaccination or not-following a plan of sexual behavior

Participants mentioned that whether or not they needed this vaccine depended on their sexual behavior. By reading the educational flier, participants learned that HPV is sexually transmitted; thus participants said that as long as they did not have sex, they did not need to receive the vaccine. Several female participants discussed being vaccinated only before they planned to have sexual contact. Some participants said they would only accept the vaccine before getting married. "*Right now, it's not the time for vaccination because I am not having sex.* " was the most frequent opinion. Following is a typical conversation among the female CIS:

A5 (20 years old, freshman): "I am not likely (to get the vaccine)! I think for me, right now, there might be a side effect that is not predictable. Thus, I won't get the injection now. Maybe five or six years later."

B5 (20 years old, sophomore): "I won't get the vaccine. Because I am not having sex yet, thus I am not going to get the vaccine. (I will get the) injection before I get married, together with the premarital checkup."

Similarly, some male participants thought they were not at risk for infection as long as they were not having sexual contact. They commonly thought that "*If HPV is mainly transmitted through sex, I think I am not at risk at all*" and "*I think there is no possibility that I will get infected*" Participants tried to explain that they are not having any type of sexual contact thus they don't need to worry about HPV infection. Participant B10 (male, 21years old, senior undergraduate student) said: "*I think Americans are more*

open minded about sex, (they need the vaccine), it won't apply to me." Most participants indicated that they were not sexually active. Ii was clear that it was awkward and embarrassing for male students to admit that they were not having sexual contact, thus, all references to "*having sex*" were omitted from their conversations. What they said was a strong indication that "*It is not something that I should be concerned about.*" Participants thought that as long as they practiced safe sexual behavior, then they were not at risk for infection. When pressed further, they said they believed that using condoms and being limited to one sexual partner was "*safe sexual behavior.*" Following is a conversation among male graduate students in focus Group 7:

B7 (28 years old): "If the man always practices safe sex, then he won't get the infection, right?"

C7 (26 years old): "If you could be 'always safe' (heavier tone in always safe), then you won't get the infection."

B7 (28 years old): "Is it 100% true that you won't get the infection?"

A7 (27 years old): "Nothing is 100%."

C7: "Even the vaccine is not 100% guaranteed."

A7: "Yes!"

D7 (25 years old): "Still, I don't need it (the vaccine)! There is no need for me. If there is a need, I will get the vaccine first (laughing from the rest of the group)."

Male participants generally suggested that women should receive the HPV vaccination. Men believed there are more serious consequences if a woman becomes infected. Women might contract cervical cancer from infection and men could not. Other

diseases such as genital warts were not varied as a concern for females; only a man could get them.

As C7(male, 26 years old, graduate students) said: “(Genital warts?) It doesn’t matter, when the man gets it, then it was it (nothing to do with women). But women will get cervical cancer.” As D6 (male, 24 years old, graduate student) mentioned: “Because the cervical cancer. They (women) should protect themselves. Also, the gay people.”

A similar conversation from the male focus Group 9:

E9 (27 years old, graduate student):” Literally, women are at risk of cancer, men are at risk of genital warts. You could not cure the cancer, but you could cure genital warts, thus a woman’s problem is more severe. Yes, cancer is not curable, so the infection affects women more. So, personally, I think women should get it (HPV vaccine).”

D9 (32 years old, graduate student) : “I think men could worry about the infection afterward (they get sick, genital warts-no big deal)!”

A9 (27 years old, graduate student): “Very minimal risk (for a man). Facing very minimal risk...it won’t happen to me (I won’t get infected).”

D9 : “Minimal risk. I think men should worry about smoking and drinking problems instead.”

Male participants thought that HPV infection did minimal harm to them. Furthermore, male participants would like to take the risk, they thought “*It is definitely bad luck to get infected*!” and “The infection is an opportunistic thing.” They thought that

HPV vaccine was no use to them and the harm of infection to them was not as much as it was to the women. As A8 (male, 25 years old, graduate student) said:

> "I think everybody would think about the harm from the infection. I think girls could recognize the infection will bring a lot of harm to them, but men will think 'it is possible (to cause the genital warts and anal cancer)! so?...' It is not necessary. We don't care. I think everybody will evaluate their situation and benefit. I think things like this. If you tell a guy that it is very important and very serious; it could lead to death or something, hearing this, they will think, shoot! I need to get it (the vaccine)."

The "they" here not only stands for women, but also "*women and men who are sexually active*." Participants suggested that sex workers and the gay population were also at higher risk, that they should be the ones who get vaccinated.

As C8 said: "*The workers, the sex workers! (laughing) Also, people should evaluate themselves (how sexually active they are), and then decide whether or not they should be vaccinated*." Discussing possible health outcomes of HPV infection, participants were surprised when they heard "*anal cancer*." Since they thought anal cancer can only happened to members of the gay community. Thus, male participants in Group 9 thought that as long as they were not gay, they didn't need to worry about the infection and the disease:

> D9: "Actually, I think only women need this vaccine! I will not have any physical contact with a man!"

B9: “If every women is free of the infection, then I think men, (laughing from the rest!) I think men, the straight ones don’t need to be worried. As long as one side is clean, it will be protective for the other side.”

A9: “You guys have no sense of responsibility! You prefer women to be the responsible ones. How could you behave like that! I am strongly criticizing about you, criticizing (in an artificial and pretentious tone) (laughing from the rest).”

As the previous conversation shows, when the facilitator told the male participants that vaccinating men could provide protection to their female partners, some of the participants admitted that they should be “*Responsible*.” Male participants were still not in favor of being vaccinated, as participant C1 said: “*After learning that it could protect my partner, I became more interested in receiving the vaccine, you know, previously, my interest was minus 100, now raised by 20 points, still minus 80. Still won’t get the injection though.*” There was no motivation for male participants to receive the vaccine, as participant B1 said: “*I think it’s like this, if my partner wants me to receive the vaccine, I will. The vaccine won’t hurt me, right? If she hasn’t heard of it, then I won’t want to bring up the topic and get the injection*.”

Interestingly, male participants also recognized the double standard that society puts on the sexual behavior of men and women. As C2 said: “*Men would, women would not (if they get infected, they will tell you). Because traditionally, it is thought that men are awesome if they got multiple sexual partners, women would be sluts. Though I don’t think this standard is correct. But we will be influenced by*.”

There were participants who still held a negative view of the vaccine. As participant C3 commented: “*If that’s the case, both sides should receive the vaccine.*

However, who is at risk? Who should receive the vaccine? Women or men? I think those who are at risk should get the vaccination! It doesn't make sense to me that people who are at very low risk should be vaccination."

6.4.3 Theme Two: "Cultural and Scientific Beliefs about vaccination."

When in the United States, do as the Americans do.

Participants said that when CIS arrive in the United States, they should do things as Americans do them. They said that many students became very sexually active (as discussed previously) after they arrived in the United States. Thus, they might be as much at risk for exposure to HPV infection as Americans. As the conversation developed in Group 1:

> D1: "I think for sure we should get the vaccination, you know when we came to the US, there were a lot of changes in our life. I think as long as the international students enter the United States, they should be informed of the vaccine."
>
> C1: "In the United States, I think the vaccine is free, right? Also, you are at a higher risk of infection when you are living here as the HPV infection is so common here, thus, I think it is difficult to keep your previous life style and avoid the virus. "

Participants mentioned that many students date native-born Americans outside their race, making them equally at risk as the Americans. International students were at the same risk as other local people, and one should do what Americans do when living in the United States. A conversation in female Group 3:

> A3:"International students should get the vaccination, specifically when you begin to date the natives, have the Caucasian boyfriend, right?"

C3: “Yes, I agree with you. I will get the vaccine. I won’t date white guys, but can’t say I never will. If other people don’t want to get the protection, at least I have it.”

I3: “When living in the US, we have lots of chances to connect with the local people.”

C3: “It is like going to Africa. Before you go, you might want to get many vaccines against possible infections such as cholera, since the disease is more prevalent there. Thus, do what the local people do, follow the local culture.”

A3: “Follow the local culture! Haha (Everybody laughing for 10 seconds). Maybe it should be put on the new international student admission brochure: “Follow the local culture when you are living in United States.”

B3: “Get vaccinated right after you land in the US!”

Strong science believers

Approximately half of the females and less than one-third of the male participants expressed positive feelings of HPV vaccination from the beginning to the end of the discussion. They were not influenced by any of the concerns that their group members shared with them. They were strong believers in the science of vaccination. They believed that if the vaccination could help reduce the risk of cervical cancer and other diseases, then it was worth having the shot. As female participant B3 (female, 24 years old, graduate student) said:

“I think we should get vaccinated no matter what. It should not depend on your sexual behavior. The virus could be transmitted through skin contact, you are surrounded by the crowd, certain social norms or manners that result in physical

contact such as kissing or hand shaking, you make contact with others, whether you want to or not, you connect with people. You get infected before you even notice."

Similar stories were in the following conversation:

A10 (male, 18 years old, freshman): "I think this is a prevention vaccine, I think I should get it. I think it depends on the record of the vaccine, the side effects and other things, as long as the vaccine is reliable and safe, I will get it."

D10 (male, 22 years old, senior): "I am not worried about the side effects."

C10 (male, 21 years old, senior): "I don't have any concerns, the technology of vaccination has been developing for 200 years. Why should you be concerned? Based on the statistics, it's always right to get the vaccine."

The Western vaccine is not fit for Chinese

Some female and male participants mentioned that since the vaccine was developed in the western countries, it might not work for the Chinese population. As the male participants discussed:

D6: "I heard that the Asian body is different from the American body. If they are different, maybe they will react differently to the vaccine."

B6: "I am thinking the same."

A6: "Also, because of the individual difference, the vaccine might not work for everybody. Some people could be allergic to it. For example, I am allergic to Penicillin, so I am resistant to a lot of things. I won't get this vaccine because of this. Could you get allergy tested before receiving the vaccine?"

Naturally, college and higher educated participants talked about whether the vaccine had finished the clinical trials among Chinese people. If not, they were afraid that it might not work on them. The facilitator was very surprised about their scientific thinking about this vaccine. As shown in the following discussion of male participants' Group 8.

A8 (25 years old, graduate student): "I don't know whether they have tested this vaccine among Asian or Chinese populations."

B8 (27 years old, graduate student): "Why?"

A8 : "I think the previous research with this vaccine was based on American people, how about Chinese, have they done the research among Chinese people? In China?"

E8 (27 years old, graduate student): "I agree with you, I am also afraid the vaccine might affect Asian people's bodies differently than Americans."

6.4.4 Theme three: Communication about HPV Vaccination With Partners

Female participants

Younger female participants were more open to discussing this vaccine with their boyfriends. They said that if they wanted to receive the HPV vaccine, their partner would fully support their decision and receive the vaccine together with them. Some participants mentioned that there is no need to tell their partner about the vaccination and their partner would be uninvolved in the decision making. Some female students said: "*I don't care about how he (boyfriend) thinks about the vaccination! If I want to get it, I just go and get*

it!" Female students showed much independence with respect to the decision making regarding the vaccination. As participants of Group 4 said: "*Just get the shot! They will not think about it. Or go and get the vaccination together! En (thinking), right! Just get the vaccine together (with boyfriend).*" Participants also said that their boyfriends should not judge them by what they wanted to do. Other participants thought since vaccination is type of protective medical behavior, their partner should not disagree with their decision. As mentioned in the following conversation among members of Group 5:

D5: "Oh, I think If I decided what I want to do, I won't care about what he thinks about it."

A5: "If my boyfriend doesn't like it or doesn't agree with it, I will just (dump him), and get another boyfriend!"

E5: "Why should he disagree, it's not something bad?!"

D5: "But my boyfriend might think like this: 'Do you doubt my health? That I am sick or something? Got infection?! (Laughing from the rest of the group members!)"

As in the previous conversation, beyond all of these independent comments, there were some concerns regarding a partner's reaction. There was this discussion in Group 3:

A3: "Maybe there will be a drama, he might get angry and saying: "Oh, you don't trust me?! (Laughter from the rest!)"

C3: "It is possible, totally possible. Also he could think that since our relationship is very stable, why do you want to get the vaccine?"

B3: "I told my boyfriend this noon that I will participate in a focus group discussion, he said: 'Ok~!' Then he told me that the infection won't cause disease

in men, but could cause disease in women! I think if I want him to get the injection with me, then he will do it without a problem. (Oh, oh from the participants! Surprising tone!)"

C3: "Your boyfriend is very considerate. I think it's like the premarital examination, it is mutual."

B3: "I think for a subject such as STI, I think both sides should be sincere, the two should treat each other sincerely."

C3: "I think it depends on yourself (whether you want the vaccine or not). If he doesn't know you're getting the injection, then it's fine. If he knows, you need to suggest to him that he also gets the vaccine with you. Sometimes, you just don't know what might happen if he knows."

Married participants were even more concerned about their partner's reaction. They said husbands might doubt their fidelity if they expressed interest in being vaccinated. A conversation among participants in Group 1:

D1: "I think my husband will be mad. He will say why you want to get this injection. We are in a one on one situation, why do you need this vaccine? So I think even if I get this vaccine, I won't tell him. If both are very healthy, it won't put you under the risk, I think. Right? I think sex is the major way of contamination. Thus, I think married people, if you want this vaccine; it might indicate that something else is going on! (Laughing from the others). But really, I think it is necessary."

A1: "I think we should think more objectively about this. I am not married now, I think being married is another case. I don't want to get the vaccine right now. But

if he would like to get the injection, I will support it. I think it's all based on the objective facts. That having the vaccine is protection. You should not mix your feelings into the decision."

Male participants

Male participants talked about a partner's opinion from a different perspective. They thought what their partner thought about their intention of having the vaccination depending on what kind of person she was or her knowledge level about this vaccine. Participants also mentioned that Chinese culture is very conservative, that their partner might become angry because they might think they plan to do something unfaithful. A conversation in Group 6:

B6: "I think it's her decision, whether she paid attention to these things or not. If she has never heard of it, she might not care about it. I think it depends on whether your partner knows about it or not. Whether she is afraid of it or not. If you are afraid (about the infection and the diseases), then you will get the injection. If you think the infection rate is not high enough, and you have got very strong immunity, then it doesn't matter."

A6: "I think it depends on her education level and her perception of the vaccine. If she is not educated, then she might not won't trust you. If she has a very good education, she might make her own decision regarding the vaccination. Also, it depends on her health consciousness, if she thinks this is very important, then she might want the vaccine. You know, Chinese people are very conservative, things like this, we won't talk about it openly. You know, related to sex. This vaccine is not heard of in China. If she hasn't heard of it, she might won't want it."

A similar quote came from participant D8:

> "I think she will reject the vaccination. I think she will reject this kind of thing as her first thought. Just like you know, when you make a decision, you don't think much. She must just resist to it. I think there is an 80% chance that she will say no. She might accept it, it all depends on her. But if you just said that without reasoning, her first reaction probably would be no."

There were only a few male participants who mentioned that there was a difference between wives and girlfriends, that a girlfriend would not influence his opinion, it depended on the level of commitment. As participant A5 (who has a Caucasian girlfriend) said:

> "I think I will just go and get the vaccine before I tell her. I think my girlfriend, you know the white people, they don't care. The girlfriends and relationships come and go. If she is Chinese, she might think afterward what you want to do with the vaccine as a sort of protection, something like this. If my girlfriend is white, if she wants to know, she need to learn it by herself. If she wants to get the vaccine, she could go and get it. It depends on your girlfriend, who she is. Whether she is very understanding or she is a bitch! (Laughing from the rest of the group.)"

With parents

As a young adult living abroad, participants said that they could decide for themselves whether they would like to have the vaccination or not. Depending on their age, participants have different levels of attachment to their parents. Older graduate participants said that they made their own decisions and did not need to let their parents

know. Most of the undergraduate participants said that they usually discussed these kinds of things with their parents. Some participants said they will ask for their parent's opinion before they have the vaccination because their parents are health-related professionals, such as pharmacists or physicians; thus they trusted their parents' knowledge about the vaccine. Most participants said that parents could not provide much of an opinion since they knew nothing about this vaccine. There is not much information or knowledge about this vaccine in China; it is not a well-known medical option. The following discussion took place among participants in Group 5:

> E5 (female, 20 years old, junior): "I talked to my parents about this vaccine, it's for cervical cancer, my mother asked whether it works? My dad said 'don't get it.' I think because they don't know much about this stuff, thus, they don't know what to do with it."
>
> B5 (female, 20 years old, sophomore): "There is no vaccine like this in China and no information at all."
>
> C5 (female, 21 years old, junior): "It's like if you are telling them you are getting a MMR vaccine, they will say 'Oh, go ahead and get it' because they knew about it already. It sounds familiar to them. Also you know I had this physical examination before I came to the US. I had my small white vaccine note book when I was little, my mother told me that if I received a certain vaccine, then there was no need to inject it again. They tend to think it's bad to inject too much (agreeable nods from the rest of the group members)! They tend to wonder whether something wrong might happen with multiple injections. When the

> doctor said one thing about this new vaccine we have now, but the vaccine had not come out yet. It leaves doubt there."

Besides the doubt of it not being a not well-known vaccine, some participants said as long as it was medical practice supported by the government, their parents would support it. Other participants said that it was hard to explain to their parents what HPV vaccination actually entailed. Parents was easily confused or misunderstood the vaccination. Parents might worry that their children would practice unprotected sexual behavior. As participant C3 said:

> "When they look at this flier, my mother could understand. They will let me go and get the shots. In my family we believe it's totally fine to receive shots. It doesn't matter whether you are ill or not. The shots are all good. I am just joking. Previously, when little children caught cold or flu, they always got the injection. I think they might have a second thought, my mother might react as 'what are you doing? You don't even have a boyfriend! Why are you getting this shot. Why? What do you want to do?'"

Other participants thought that knowing this vaccine is sexually related, their parents would not think they needed it. However, the minds of parents nowadays have developed with the time; they recognize the different needs of different generations, and that there might be a need for a vaccine for the younger generation. Participants also recognized that in their own generation the patterns of sexual behavior are different from those of their parents; thus, they need prevention for negative health outcomes related to those behaviors. They specifically noted that their sexual culture is different. In the conversation among members of Group 4:

E4 (female, 23 years old, graduate student): “You know, my parents will think that you young people have so many things going on! We had nothing (treatment or vaccine) when we were little, nothing happened to us now. We are very “Pi Shi,” do you know the word?” (Pi Shi means very strong in one type of Chinese dialect.)

F4: “I think their time was different, a different era. They didn’t have so much unhealthy food then.”

C4(female, 21 years old, Senior): “Also, people were not that wild then.”

E4: “It’s all one-to-one sex relationships. Now it’s many-to-many! (Laughing! Haha Many-to-many!)”

F4(female, 25 years old, graduate student): “Right?”

C4: “I think people in China are very wild now. A lot of young people are very wild, sexually. You know, in China, it’s a very big deal to get pregnant. Here, college students might bring their children to school. They are not allowed to have an abortion, right? Some of the states don’t allow it. You know, they have this promotion of pro-life on campus, so horrible, the pictures! So what can they do if they want an abortion?”

F4: “You know, Chinatown got a clinic.”

C4: “Oh, oh my God!”

With friends

Both male and female participants said they would only talk to their close friends about the HPV vaccine. It is not an appropriate topic to discuss with friends who were not close. Also, since the vaccine is related to sex, they would only talk about this

vaccine in certain contexts so that it was not awkward. Most participants said it was not an appropriate topic to talk to everyone about or that it was a topic that should be discussed in intimate groups. As the conversation in Group 3:

> A3: “I would recommend the vaccine to others, but I think it’s little embarrassing if you just start with this topic! When you are eating with friends, and then (Laughing from the crowd! Apparently, everybody agreed that it is not an appropriate topic to mention during small talk.) you said that: ‘ Hey, you could get this vaccination, it’s to prevent HPV infection, the STI.’ I think everybody will lose their appetite.”
>
> C3: “I think maybe when you are discussing a premarital checkup with friends, then you probably could mention things like this. But you won’t talk about this just to talk about it.”
>
> A3: “Don’t you think that we Chinese girls, we just don’t like to discuss these topics? Or...”
>
> A lot of people want to jump into the discussion.
>
> C3: “You could discuss it with your best girlfriend. I have a friend, before she got married, she talked about a lot of things that she wouldn’t talk about previously. A lot of things! She said that if you think your boyfriend won’t protect you, you need to protect yourself. Both of you should be careful. If he hasn’t done a premarital checkup then both of you should be careful about the diseases. Something like this.”
>
> A3: “I think maybe I will talk to my best friend, the usual friends, I won’t talk about it with them. People might say that you might be might be... (Thinking

about the word, nothing came out, laughing from the rest.) You talk about this..." (Laughing from the rest.)

C3: "Generally, you won't talk about this just with everyone."

Most female participants said they would have no problem sharing the information with their close friends. As E5 said: "*If I want to get the vaccine, if they are my close girlfriends, I will let them know. If not very close, I might not talk about this to them! But if they ask me about it, I will admit, anyway, it's for prevention*." A similar conversation took place among the males in Group 9; as A9 said:

> "I think we Chinese are very conservative when it comes to sex. We won't talk about getting HPV vaccine when during conversation. Other people might think you are weird! What's wrong with you?! They would think like this. So I don't think the vaccine should be recommended by your friends. I think the society, the health department organization, the hospital, they should promote the vaccine and advertise it, among all age groups, groups suitable for marriage, groups entering college, people should send out fliers and provide information."

During a similar conversation among members of Group 10, it was discovered that there were certain health outcomes related to the HPV vaccine that made the men feel uncomfortable about talking to others about it; some even recommended not mentioning the sensitivity aspect of the vaccine:

> C10: "I think this kind of stuff (HPV vaccine), that it could prevent the anal cancer, I think you don't need to mention it that much. I think most people, they don't know much about it. If people don't think about the 'dirty' diseases, recognizing the vaccine as type of protection, people would accept the vaccine. If

I am talking to my very closed friend, I might explain more. If it's just a friend, you might just mention about it and that it's protective. We received many different types of vaccines when we were little. Nobody could tell the differences between the vaccines. You don't need to tell people, or in that much detail. Then the vaccine might fly."

B10: "I think this vaccine is very private, related to people's privacy, thus I might just recommend it to very close friends, in a very relaxing situation and try to make them curious about it by themselves. They could make their own decision."

However, male participants mentioned that they were more likely to recommend this vaccine to their friends who were sexually active, those friends who were in need of protection. As participant A1 said: "*I think I will see their lifestyle. I think if they are religious, that they will not do that kind of thing before marriage, that they will not have one and another (sexual partner), then maybe not. But if they have a lot of demand for sex, then I will let them go and get the shots*."

They even expressed concern that their friends might feel offended by thinking they were identified as living a promiscuous lifestyle. Again, there was a label issue here, however, you might not know if certain friends could be labeled as "*in need*" of this medical prevention. As said in Group 8:

D8: "If I have a friend who is very open in this aspect, I will recommend this to him."

B8: "Don't think like that, if you think in this way, that friend will not be happy about it. He will think: you think I'm promiscuous."

Most male participants said they would not recommend the vaccine to their female friends, because it is really not appropriate to discuss this kind of topic. However, they could talk to their girlfriend with less pressure.

D8: “I might recommend this to my close girlfriends, but if it’s just a normal female friend, I won’t. (Why?) What if they have boyfriends (shrink his shoulder).”

B8: “If they have a family history of those diseases, I will mention it to them.”

Participants thought that they should educate their friends about safe sexual behavior, which was more important compared to informing them of this preventative vaccine. Mentioned in another discussion:

B8: “I think we should educate people about the vaccine, whether they want to get it or not is their own business.”

A8: “I think if you recommend this to other people, it will affect your relationship with them.”

I: “If you have cousins, will you recommend the vaccine to them?”

A8: “I think maybe I will let their parents know, instead of them.”

C8: “Is it my turn? Right, I think as a friend, I won’t recommend this vaccine. Here is my logic: If I have a friend, such as E (laughing from the rest of the group), I will give him the knowledge, everything about the Human Papillomavirus! But rather, I would tell him how to protect himself, tell him about healthy behavior. If I just let him know there is this vaccine, you could get it, he could still get sick by so many other viruses, yet I only recommend this vaccine, it doesn’t make sense!”

6.4.5 Theme Four: Perception of HPV infection

Stigma?- HPV infection is different from other STIs.

Participants did not perceive HPV infection as a type of sexually transmitted infection; thus, they did not recognize the HPV infection as a stigmatized infection. Furthermore, due to their lack of knowledge and awareness of this infection and its possible health outcomes, they did not think HPV infection was as severe as other STIs, such as syphilis and gonorrhea. Influenced by Chinese culture, those two types of infections were considered as "*dirty*" diseases, sensitive and immediately recognized as being related to sexual behavior and being sexually transmitted. As mentioned in the following discussion in Group 6:

> A6: "We all go to college, when we look at those kinds of things, we perceive this vaccine from a scientific perspective, from the knowledge we learn. However, when you mention syphilis and gonorrhea, traditionally, we know those are very dirty, dirty stuff. We learned about those from normal everyday life."
>
> B6: "Also, the previous education and the media, when mentioning sexually transmitted diseases, it is always about syphilis and gonorrhea. Not HPV nor HIV, thus I think education is not enough. For me, you know sex is not linked to this infection, unlike syphilis. You know, I haven't built up the association in my mind. You know, if you say someone got syphilis, I think about it (sexually transmitted) immediately. But if you say someone got HPV infection, I think about nothing. Ok, got 'A' type of infection. I won't think much about it nor would I be scared of it. I think because don't know the disease. Unlike syphilis, I know it's horrible. For HIV, I think if we don't have sex with them (people who

are positive), then it's fine. So I think people should be educated about this virus and the vaccine, when you promote the vaccine. I think if you want to promote the vaccine, you should start with education."

D6: "I think this is different from the syphilis and gonorrhea. I also haven't built up the link of the disgusting feeling with the disease, like syphilis and gonorrhea. But when I see this..."(interrupted by others.)

C6: "Just by looking at this, won't think it's serious. You could get cancer, it's a very common infection and many people get it. Knowing you won't get infected from hand shaking with AIDS patients, you are still scared when you shake the hand. Looking at this one, you don't think it's scary. You still play with people with liver cancer.. . It's like…"

D6: "It's like E.coli (infection)."

C6: "Right, right, it's like E.coli. You won't think about that infection."

As demonstrated in the conversation, after knowing that HPV infection is very common, and that 90% of the infections will disappear within two years, participants commented that HPV infection should not be a concern. Some participants even compared HPV infection to E.coli infection or getting the flu, they considered them to be of similar concern:

A1: "I think many people got infected, and they turned out fine. I think you should be concerned when you get the disease upon infection. Who got the virus, you know, only got the virus, you get the virus tomorrow, you (pointing to another person) got the virus, it's hard to tell and no big deal. I think you need to

worry about what you need to do when you are actually sick, and the treatment afterward."

B1: "I think if a pap smear test tells me that I have got the virus, I won't let my parents know."

C1: "I think only the infection, the virus could disappear as easily as influenza virus. However, when you got the diseases (cancer, warts), it's a whole different level of problem."

Response of HPV infection.

Even though participants mentioned that they had not recognized the HPV infection as a type of STI and that should be stigmatized, knowing the facts led to several reactions and outcomes.

What happened?-the source of the infection

Female participants were more curious about where the infection originated. Most participants mentioned that if they themselves contracted it, they would wonder about the source of the infection: "*How did I get infected*?" They also wondered: "*Who gave me the infection?*" Some participants thought about informing their sexual partners. As participant A3 said: "*I think I will call my ex-boyfriends one by one, and question them: "Is it you? Is it you?"(Laughing from the others.).*" The female participants thought it would be really bad luck to contract the infection, and they would review their sexual history to find out how they got infected. The following conversation took place among participants in Group 1:

B1: "If my test is positive, I will think about what caused that, what happened, I will think through my history, and then go to see the doctors."

A1: “I will think about how many men got involved. Same time, try to reduce my chance of getting infected again.”

B1: “My first reaction might be why I am the unlucky one. I think a lot of people just take their chances, they think this disease will never happen to them. When it does, they just think it’s bad luck.”

D1: “I think this is horrible, because, you might think about oh, I am having bad luck, then I got infected. I think young and single people should get the vaccine, it’s safety.”

Male participants did not think of, or question, where the infection came from or seek to blame others. Male participants were more concerned of how to deal with the situation. Assuming they, or their partners, got the HPV infection, male participants’ first reaction was usually : “*Go and get treatment*!” Participants mentioned a few feelings regarding HPV infection; they would feel desperate, helpless, or ashamed. A discussion in Group 6:

C6: “Your life will be grey after (the infection). I don’t know if the infection is untreatable, but now I know, then it’s horrible.”

D6: “Disgusting. I will be sick of myself (if I got the infection).”

C6: “Disgusting. I think it is similar to syphilis”.

D6: “I don’t know what’s the difference, I think the infection with the virus is fine, but some of the resulting disease is not good, it’s sick.”

B6: “I think we will think about why we got infectied, we will think about it. If it’s my fault (being promiscuous), then there is no way to deal with it. But if it is not my fault, then I will be surprised, and not knowing what happened, that I got

the disease. Then I will think about the treatment, ‘baidu’ (search engine, Chinese version of ‘google’) it, haha. (Laughing from D). I will panic.”

C6: “I think I will cut it off (referring to the penis), (laughing from the rest) it is so scary. That kind of growth, just cut it off.”

D6: “Your life is more important.”

Timing of the infection

Participants agreed that the timing of the infection was very important. It mattered a lot whether or not you became infected during a relationship. If your partner contracted the infection before the relationship, then it is less traumatic. Participants acknowledged that their partners might have had multiple relationships previous to their current relationship. If the partner became infected before, as long as there is not cheating within the relationship, the situation will be dealt with differently. As participant C3 said:

“He got infected before he met me or after (we met)? It is very important! (Laughing from the rest). If he got the infection before he met me, I have nothing to say. Because I didn’t know him. If he got the infection after he met me, then I will get a checkup myself first and then question him.”

In a similar discussion among participants from Group 5:

D5: “Also, you don’t know when your boyfriend got the infection!”

C5: “What if he had got sexual partners previously?”

D5: “Yes, you cannot tell whether they had sex before or not.”

B5: “Can you find out when he got infected?”

Participants also talked about the possibility that their partner’s infection came from them. They joked about what to do in the situation that one could not trace the

infection back to its source. Should they move on with the relationship? As the members of Group 3 discussed:

A3: “If the infection comes from me!”

C3: “Then both of you just move on! (laughing)”

A3: “What if the examination shows that both of you got infected, and there is no way to tell who got the infection first, what should you do?”

C3: Oh, my, if it’s hard to tell, just move on. Don’t talk about it! (Laughing from the rest.)”

B3: “Then the two of you go to treatment together.”

A3: “It is really hard to tell whose fault it is. If you want to do the test to find out when you got infected, the doctor could not tell, right?”

C3: “So before you two got close, checked yourself that you are clean, then after you two were together, you haven’t done anything special (laughing from the rest). Then he got sick, so you know it’s not your problem. So it is very important to get a checkup before you two are together (indicating sleeping together).”

The possible consequences

Participants struggled with whether or not contracting the HPV infection would signal sexual promiscuousness. If a partner became infected, does that mean he or she is cheating with others? Both female and male participants mentioned that their partner might think negatively of them if they were the ones who initially contracted the infection. Would a person who became infected be perceived as promiscuous? A discussion in Group 3:

C3: “Prosmiscuous! Or maybe you just got bad luck. You might only have got one sex partner before, and you got the infection. It’s just bad luck.”

(Undistinguished murmuring from the rest of the group members: “Wow, what if he/she just had sex once and got infected? What if it is like that.”)

F3: “I think few people could agree to use protection during sex after the infection. I think it’s hard for people to do that.”

C3: “Maybe sometimes, you know people understand what it is, what this infection is, that it will go away after two years. Then it is fine, right? For people who know how it works.”

Participants mentioned that if everyone knew about how common this infection was, then there would be no trouble thinking about it after contracting it. A similar conversation took place among the participants in Group 2:

D2: “It’s bad when one side of the relationship is very scared of it, if they got terrified, (they might say things like) ‘keep away from me!’ Something like this.”

B2: “Right! I think it’s like how we were scared of HIV before, but when you know a lot about it, it is not that scary, right? When you have the knowledge.”

As male participants in Group 10 discussed, if you got infected, you should keep away from other people to reduce the pressure:

A10: “I think others could think negatively about it. They will think you lived an immoral life style. Either you don’t pay attention to hygiene, or your sperm gets inside of your head. You need to pay more attention.”

C10: “If others know about your infection, you should be more self conscious. Don’t do things that might cause uneasiness for others. Don’t shake their hand or

something. They might think poorly of you, that you don't care about them! You have no way to deal with it. If you told people, people knew it, then it's bad. I think I am very practical. I just think more about the people around me."

Participants mentioned that HPV infection could be linked to cheating in the relationship. Thus, knowing one's partner was HPV positive, they would doubt that person's loyalty. In a conversation among members of Group 6:

A6: "There will be. There will be doubt about each other."

D6: "Yes, the loyalty."

B6: "I think if she told you what she did previously. Then it is better than not saying anything. But if she did not mention anything, then you have been unrealistic. You think too much and think wildly. Then it's bad. It could influence the relationship. If she told you everything, then there is not much influence, you will pay more attention to how to treat this disease instead of focusing on the relationship."

C6: "If your girlfriend has other boyfriends before this relationship started (she got the infection from a previous relationship), then. It is fine."

Participants mentioned that according to Chinese culture, cheating would not be bearable in a relationship and could lead to the breakup of a family. Most of the participants stated that it might be hard for them to continue the relationship. In a discussion among members of Group 8:

C8: "It is a situation that would break the family following traditional Chinese value. Cheating is not acceptable even in the United States. There is a very high divorce rate here, because cheating is big deal. Yeah, it could break up a family."

B8: “I think nowadays, most Americans are still traditional, if they think their partners are cheating, it is big deal for the family.”

D8: “I agree with C. It depends on the situation, (infected) in the marriage or before.”

However, some participants said it would take further consideration, such as what was the timing of the infection of their partner. Again, it shows that participants did not reject the idea that their partners had premarital sexual encounters previous to their relationship.

D9: “I think I won’t keep the relationship anymore.”

B9: “I think it’s related to the last question, that you will look down upon the person and how she got the infection. I think that will influence my judgment.”

C9: “I think this is only a clue (of cheating), you know she is sick, you need to pay attention to her contact with others. I think it’s just a clue. Because, there might be other ways to get the infection, when the bathroom is not clean, it’s dirty, right? I will worried about it and wait.”

D9: “I think if she has got the infection, she might give the infection to me, thus I need to think about it. It depends. But the transmission, this part, it’s ....”

With respect to the concern of infidelity, the timing of the infection might make a difference. Some participants thought that they would not end the relationship based on certain situations; still, there might be a knot (concern) that stays in their mind and later might negatively affect the relationship. See the conversation below:

B2: “I think in real life, you need to protect yourself. Actually, a disease won’t change anything. Unless, something else happened. I think treatment is necessary.

I think you need to treat the disease. (A: The infection will go away by itself!) Just thinking about it, I think he is someone you love, and he got a disease, I think psychologically, you can't just dislike him immediately, it takes time to digest news like this."

D2: "Do the test before you have sex!"

A2: "I think if you find out your partner got the infection before you got married, I think I will examine myself. If I have the infection, then just let it go, do whatever you want to do (laughing!) But if he is infected, and I am not, then I think I still have an opportunity (to meet other people?). I don't know, I think it will affect the relationship. I don't know."

C2: "I think what she (looking at A2) said makes sense to me. If I got the infection, I don't know what he will think about it. If he got the infection, I will think about it. If a condom could protect, if it could not, I don't know. I think you need to test for the infection first."

Participants discussed possible ways to prevent the infection. They mentioned using condoms, vaccines, and Pap smear tests. Participants repeatedly asked questions about whether or not condoms could be 100% effective in preventing STI and HPV transmission. Male participants mentioned that condoms are not reliable and that they were constantly hearing stories that frequently condoms failed. Still, some participants thought that if their partner became infected, they could use condoms to prevent the infection from spreading to themselves. In a discussion among Group 2 members:

A2: "I think condoms could not prevent the infection 100% of the time. It could break during during... (laughing)"

D2: “I think I have a very minimal chance of contracting the infection. My partner, I don’t know who he is, or where he is now. If he got the infection, I will get the vaccine and use condom during sex, I could also do the pap smear test later on to prevent the cancer. I think if both individual got the knowledge, it wouldn’t affect the relationship that much.”

6.5 Discussion

This research explored CIS’s perceptions and beliefs regarding HPV infection and HPV vaccine. It described Chinese young adults’ opinions of HPV vaccination and STI prevention among this unique international student group. CIS expressed their concerns about the safety and their intentions regarding the vaccine. They also shared how they might discuss the HPV vaccination with their partner, friends and family members. There was little evidence of stigmatizing HPV infection. Through their enthusiastic description and discussion, their experience of living as international students and their cultural values of: sexual behavior, prevention of STI, relationship with parents, friends and partners was revealed. Compared with the Chinese female participants of previous research (middle aged or younger groups of women from communities (Li, et al., 2009), undergraduate college students (Hsu, et al., 2009), CIS not only are young Chinese adults, they were also Chinese young adults with an international educational background. Furthermore, the fact that CIS were living and studying in the United States put this study into more of an international focus.

CIS expressed concerns regarding the HPV vaccination that had not yet been revealed by previous studies. Previous research in United States had shown that parents of teenager daughters were concerned about the eligible vaccination ages, and they

commented that the recommended age of HPV vaccine particularly 9 years of age was too young for their children to engage in any sexual contact or sexual behavior (Marlow, Waller, & Wardle, 2007; Olshen, Woods, Austin, Luskin, & Bauchner, 2005; Zimet, 2005). CIS showed similar but different perspectives at this early age of vaccination. Comparing Chinese and Westerners, CIS expressed their impressions that Chinese youth had later age of sexual behavior. They thought that the youngest and oldest age limits of HPV vaccine should be increased among Chinese youth and young adults. Furthermore, they also recognized that this concern might only apply to the CIS who were older, those who were born in the 80s, and those who were born in a later era were more open regarding their sexual behavior.

There were generational differences regarding sexual behavior patterns. There were differences in sexual cultures and sexual behaviors between CIS born in the 1990s and 1980s, even noting that there were differences between the early and later 1980s. CIS commented that those who were born in the 1990s or later were more Westernized and easily adapted to the native U.S. culture, they were the ones who were sexually open and needed STI prevention. This was consistent with previous research that found young people in China were exhibiting more liberal attitudes toward sexual behavior than was common in previous generations (Higgins & Sun, 2007).

As there were some concerns of the early age of HPV vaccination, some female CIS thought that they were not ready for HPV vaccination currently. This result was consistent with previous research conducted among 13 to 20-year-old adolescent girls in Hong Kong that found none of them held a favorable attitude toward HPV vaccination, however they believed that vaccination was not necessary for them at the moment (Kwan,

et al., 2008). While the previous research did not point out the reason behind the "why not now." CIS raised their opinions very clearly. Recognizing that HPV infection is sexually transmitted, female CIS thought they could plan their health prevention behavior following their sexual practices. Instead of following the promotion and advertisement provided by the medical practitioners, they thought they should receive the vaccine before exposure, such as before they actually had sex or were married. Interestingly, their conversation showed that they had a higher degree of control over their sexual behavior. Many conservative female CIS thought HPV vaccination could also be one type of premarital "checkup" or preparation. This result further raised the argument of the lowest vaccination age, and raised the question: could we actually control the vaccination age by following the age of sexual contact or sexual behavior? On the other hand, from a public health perspective, there was need for further education regarding the vaccination, also, there was need to examine the sexual behavior pattern of the Chinese youth and young adults which is so limited in the current literature.

Similar to the comment from the female CIS that they should schedule the vaccination following their plans for sexual behavior since they were not engaging in sexual behavior currently, both male and female CIS thought it was prudent to identify the populations that were at risk for HPV infection and those who should be vaccinated. This was different from previous research that Chinese women thought they were not engaging in sexual behaviors other than with their husband who were pure and not otherwise sexually active, thus they were not in need of HPV vaccination (Hsu, Hsu, Cheng, Fetzer, & Chou, 2010; Li, et al., 2009; Lin, Jeng, & Wang, 2011). CIS as younger adults realized there was a need for HPV vaccination and STI prevention of their peers,

especially the younger generation such as those who were born in the 90s. Recognizing HPV infection as being sexually transmitted, they believed the more liberal and younger members of the population should receive the vaccination. They mentioned a "correlation" such that the younger the CIS were when they came to the United States the more sexually active they were.

Barriers existed for CIS when it came to discussions of anything related to sexual behavior with others because there was no cultural context for it. Discussing things such as HPV infection and HPV vaccine was seen as "socially odd." CIS had difficulties communicating about HPV vaccine with their friends. Moreover, CIS acknowledged the barriers prohibiting parents from recommending the vaccine to their children. Thus, it was difficult for CIS to obtain their parents' support if they felt the HPV vaccine was right for them. Living overseas, parents exercised limited decision making control over their children. Thus, CIS believed that it should be the responsibility of the government or health educators to introduce and promote the HPV vaccine. CIS felt that, from a cultural perspective, it was not appropriate for them to personally introduce or promote the vaccine to others. They believed that once they arrived in the United States, such information should be the responsibility of hospital doctors and nurses to provide. The reality of a lack of sex education and information about HPV vaccine did not stop CIS from believing that such education and information was valuable. The results showed the demand and suggestions for delivering the sex education and providing information regarding HPV vaccine message towards this unique young adult population.

Different from the previous research that Chinese women were very much in concern of their spouse or partner's opinion of HPV vaccination (Hsu, et al., 2010; Li, et

al., 2009; Lin, et al., 2011), female and male CIS exhibited different ways of communicating HPV vaccination to their partners. Female CIS, especially the younger ones, established their position of in control of their the relationship, saying they would decide their own vaccination behavior and their partner's opinion would not affect them at all; a feeling similar to the one imparted by the popular quote: "If he doesn't like it, he can just leave!" Some female CIS said they had boyfriends who were open-minded and considerate, and who would have the vaccination with them. These claims and strong voice of control in their relationships were embedded in the unstable love relationship and the possible future multiple relationships, thus, the current love partner or the "boyfriend" became somewhat unimportant in their decision making. Also, on the other hand, we could see in this small group of younger Chinese female adults, they were much in control of their life and sexual behavior. We could see form this study that there was a new era for Chinese women, especially younger ones in dealing with their relationships, even further, their STI prevention behaviors . Male CIS, on the other hand, were more resistant to the idea of communicating about vaccination. They believed that if their girlfriends did not know about the vaccination, then there was no need to tell them. Furthermore, whether or not the girlfriend would accept the idea of HPV vaccination depended on how educated she was and her way of thinking.

Interestingly, CIS believed stigmatization of HPV infection depended on one's knowledge level: No knowledge (no stigma); some knowledge (stigma); much knowledge (not much stigma). CIS claimed that they did not link HPV infection with stigma since they haven't heard of this infection before. HPV infection and HPV vaccine became a sensitive topic only when one knew that the virus is sexually transmitted.

However, when the discussions went further, when they learned that 90% of HPV infection turned negative on its own, and most sexually active men and women get HPV infected in the early stages of their sexual behavior, the degree of stigmatization was reduced. This de-stigmatization process happens through education. It was important that people's knowledge moved beyond the fact that HPV was sexually transmitted. Without real knowledge about HPV, even the CIS felt resistance to HPV vaccination and linked HPV infection to promiscuous sexual behavior and infidelity.

There were a sex differences in CIS' reactions to the condition of HPV infection. Female CIS wondered who passed the infection to them and looked to blame others. Male participants' usual response was "Go and get the treatment!" This reflects the traditional cultural perception that males pass around infections and females are only victims. Considering this and other misinformation that is prevalent, there is a need for sexual education and STI preventive practices among CIS.

In sum, throughout the discussion, CIS generally showed more open attitudes toward sexual behavior compared to the Chinese women of previous research (Hsu, et al., 2010; Li, et al., 2009; Lin, et al., 2011). For example, both female and male CIS acknowledged that either they or their partner's previous relationships should not be taken into consideration when talking about the HPV infection. Only HPV infection acquired by cheating in the current relationship could adversely affect their current relationship. According to many participants, HPV infection acquired in previous relationships would not affect their current relationship. Furthermore, participants suggested that premarital sexual behaviors were acceptable among this population. CIS also acknowledged that when studying abroad, it was possible that they might date

members of the indigenous population. They realized that while living in the United States, they would be exposed to cultural differences and would have to adapt, although not specifically citing an acculturation process. These CIS noticed the differences, embraced them, and moved on.

6.6 Limitation and Future Implementation

Some limitations of this study should be noted. The limitations include the recruitment of a convenience sample from one large research one university. The culture and social environment could be different in another social or university setting. Another limitation was that the participants' age group was comparatively widely distributed. There was no separation between graduate and undergraduate students, or students who were born in the 80s versus the 90s. CIS who were born in the 90s and might engage in different sexual behavior patterns and hold different attitudes towards sex from those who were born in the 80s was expressed in discussion. Future studies could further address CIS attitudes and perceptions based on their age and year of school. Also, as topics explored sensitive issues, participants might have tried to express themselves more conservatively. Furthermore, the results of this study cannot be extended to Chinese immigrants who are not registered at a university as their living environment might be very different and their enrollment in health insurance lower compared to the students.

The findings of this exploratory study were encouraging suggestions that there was a demand for HPV vaccine promotion and sexual health education for CIS. This study may be a first step in rethinking traditional cultural orientation programs toward the direction of sexual health promotion among international students. Beyond the current conservative Chinese traditional culture, health promotion programs should investigate

CIS's acculturated attitudes and health behaviors, and take into consideration their developed attitudes and beliefs under the influence of mixed contemporary Chinese and Western culture. Furthermore, there should be a new platform for CIS to seek health information. As parents and friends were not perceived by the CIS as appropriate resources for support and information on HPV vaccine and sexual education, governmental agencies or school based education programs should strengthen their focus on CIS. Future studies should not only examine CIS' attitudes and intention of HPV vaccine, but also their behavior patterns, especially sexual behavior patterns. Furthermore, future studies should address CIS' awareness and knowledge of sexual behavior as it relates to risk of STIs.

CHAPTER 7. CONCLUSION AND FUTURE POLICY IMPLICATION

7.1 Conclusion

In conclusion, perceptions of HPV vaccination and STI among Chinese international students are updated through this study. Using research into individual and group values concerning sexual behavior, relationships, social support, and cultural identity through an online surveys (n=350) and personal interviews (n=44) of young Chinese adults living abroad, six major findings included:

(1) *Limited awareness, knowledge, and intention*. Only 27.2% of the survey participants had heard of the HPV vaccine. Most participants were unaware of the cause of cervical cancer, and viewed genital warts as a “secret” and “dirty” disease.

(2) *Differences in intentions and beliefs between the sexes*. In the qualitative study, only 34.9% of the male participants were likely to receive an HPV vaccine in the future compared with 69.2% of the females. This difference in intentions was the result of female participants’ beliefs that HPV infection would influence their romantic relationships and that their family members and partners would support their decision to receive the vaccination, making them more likely to comply with recommendations for vaccination from others. Other than sex, the only significant predictor of CIS’ vaccination intention was behavior among best friends.

(3) *Lack of formal sex education and sources of HPV vaccination*. CIS males and females did not consider parents and friends appropriate sources from which to seek support and information. Rather, their information came from more informal sources: street advertisements and social Websites such as “Renren.”

(4) *More liberal attitudes toward sexual behavior*. Compared with Chinese women involved in previous research, the current study’s female participants showed significantly more acceptance of the practices of premarital sexual behaviors and multiple sexual relationships. Both female and male participants acknowledged that HPV infection would only affect a current relationship if it was a result of the cheating behavior of one partner; previous relationships should not be taken into consideration. Focus group discussions supported the finding that premarital sexual behaviors were acceptable among this population.

(5) *Different sexual cultures and behaviors between those CIS born in the 1990s and 1980s.* Participants noted that those born in the 1990s or later were more Westernized, having had an easier time adapting to the native U.S. culture than their older counterparts. Because of this, the younger CIS population believed they were more sexually open and needed prevention measures for STI. This was consistent with previous research that found young people in China exhibited more liberal attitudes toward sexual behavior than was common in previous generations (Higgins & Sun, 2007).

(6) *Stigma about HPV infection by knowledge level*. Knowing that HPV infection was a type of STI was the only factor that could lead to stigmatizing the infection and vaccination. However, further in-depth knowledge about HPV infection (e.g., the fact that 90% of HPV infection would turn negative within two years of infection and that the

majority of sexually active men and women would become infected in the early stages of their sexual lives) and the logic behind vaccination could reduce or remove the layers of stigma related to HPV infection and HPV vaccination among CIS populations.

7.2 Future Implementation

There were several research and policy implications for future study resulting from this project:

(1) *HPV vaccine to be promoted alongside formal sex education among CIS.* Knowledge about HPV infection and the benefits of HPV vaccination should be included in education about sex, sexual behavior, and STIs among CIS. Through living and studying in the United States, this generation of CIS has experienced multiple cultural influences mixed with Western and contemporary Chinese culture. The CIS population has access to misleading or invalid information about sexual behaviors and STIs from many informal resources such as the Internet and online social platforms. As such, school-based education and information promotion programs about HPV vaccine and sexual education are needed and recommended for young Chinese adults.

(2) *Promotion of HPV vaccination by governmental agencies.* At the time of this writing, no HPV vaccine was available in mainland China (Cancer Foundation of China, 2014); although international pharmaceutical companies, such as Merck & Co., are currently conducting clinical research trials there. News that Bio-Tech companies in China are currently developing patented HPV vaccines has been reported; however, exactly how soon a vaccine will be available in mainland China is still unknown.

Cost-effectiveness is another concern for the Chinese government about promoting this vaccine (Yuan, 2012). There is a lack of research that targets the quantitative estimates of country-specific effects of the HPV vaccine on health and economic costs (Jit, Brisson, Portnoy, et al., 2014). According to the GAVI Alliance procurement, the estimated cost for three doses of HPV vaccine in the United States is about $13.50, and as high as $300 in high-income countries (Jit, Brisson, Portnoy et al., 2014). There were disparities among different countries about the cost effectiveness of HPV vaccination; thus, the extent of potential economic and health gain for China is in need of further study.

Furthermore, the effectiveness of HPV vaccine is compromised in China. Gardasil, the quadrivalent HPV vaccine (targeting HPV 6, 11, 16, and 18) prevents up to 70% of cervical cancer and 90% of genital warts cases in Western countries, but only up to 53% of cervical cancer in China and Asia (because of demographic differences among prevalent HPV subtypes) (Yuan, 2012). Though there are concerns that the vaccine guarantees neither a lifelong protection (five years maximum protection) nor a 100% chance of protection (70% of cancer cases), previous research has shown that regular screening combined with vaccination programs would be cost-effective (Yuan, 2012).

(3) *Mixed cultural attitudes*. Health promotion programs should take into consideration the acculturated attitudes and beliefs of CIS that are under the influence of mixed contemporary Chinese and Western cultures. Members of the current CIS generation have a more open attitude toward sexual behavior than Chinese women in previously published research studies; they are more open-minded regarding premarital sexual behaviors, multiple sexual relationships, and prevention and treatment of STI.

Their attitudes toward HPV infection and HPV vaccination vary based on their knowledge level of the infection and the vaccine. Stigma may not necessarily be a barrier for HPV vaccination promotion among this generally highly educated group of young Chinese adults.

In conclusion, there are still many unanswered questions that need to be addressed in future studies including further examination of policies regarding the implementation of HPV vaccination, sexual behaviors, and STI prevention behaviors among CIS. In addition, there is a lack of research on related topics among young Chinese adult groups who are not CIS.

TABLES

Table 1. *Demographic of Survey Participants*

Items		n	(%)
Mean Age (years old)		21.42	SD 2.441
Gender	Male	179	(51.10)
	Female	169	(48.30)
	Prefer not to answer	2	(00.60)
Year of College	Freshman	82	(23.50)
	Sophomore	42	(12.00)
	Junior	49	(14.00)
	Senior	41	(11.70)
	Graduate	135	(38.70)
How long have you living in U.S.?	≤2 years	204	(58.50)
	2-4 years	109	(31.20)
	≥ 4 years	36	(10.30)
Have you ever had a class in Human Sexuality?	Yes	134	(38.50)
	No	176	(50.60)
	Not Sure	38	(10.90)
What is your religious preference?	Buddhist	32	(09.20)
	Catholic	1	(00.30)
	Muslim	1	(00.30)
	Protestant	25	(07.20)
	None	284	(81.60)
Do you have health insurance in the U.S.?	Yes	328	(93.70)
	No	17	(04.90)
	I don't know	5	(01.40)
What is your relationship status?	Single	214	(62.00)
	Dating	121	(35.10)
	Separated	2	(00.60)
	Married	8	(02.30)
Have you ever had sexual intercourse?	Yes	121	(34.60)
	No	222	(63.40)

Table 2. *Awareness and Knowledge of HPV Infection and HPV Vaccine*

Awareness Items	Yes n(%)	No n(%)	I don't Know n(%)
Have you heard of HPV?	133 (38.1)	212 (60.7)	4 (01.1)
Have you heard of HPV vaccine?	95 (27.2)	248 (71.1)	6 (01.7)
Have you heard of cervical cancer?	333 (95.4)	15 (04.3)	1 (00.3)
Have you heard of genital warts?	195 (55.9)	146 (41.8)	8 (02.3)
Knowledge Items	**True n(%)**	**False n(%)**	**I don't know n(%)**
1. HPV can cause genital warts	70 (20.4)	10 (02.9)	261 (76.7)
2. HPV can cause cervical cancer	110 (32.1)	9 (02.6)	223 (65.3)
3. A person may be infected with HPV, but not know it	150 (43.7)	9 (02.6)	183 (53.7)
*4. Using a condom can totally prevent HPV	37 (10.8)	127 (37.0)	178 (52.2)
5. Only certain types of HPV cause cervical cancer	56 (16.3)	21 (06.1)	263 (77.6)
6. HPV can be sexually transmitted	165 (48.1)	6 (01.7)	171 (45.2)
7. Anyone who has had sex is at risk for HPV infection	105 (30.6)	44 (12.8)	193 (56.6)
8. Having multiple sexual partners increases the chance of contracting cervical cancer	189 (55.1)	9 (02.6)	144 (42.3)
9. Vaccination is a way to prevent cervical cancer	132 (38.5)	12 (03.5)	198 (58.0)
*10. Women who receive HPV vaccine do not need to undergo a routine Pap smear/test for cervical cancer	14 (04.1)	115 (33.6)	210 (62.3)
*11. Vaccination is 100% effective for preventing cervical cancer	11 (03.2)	157 (45.9)	172 (50.9)
12. Man can also receive HPV vaccine	114 (33.5)	9 (02.6)	214 (63.8)

*Items 4, 10 and 11 are not statements of fact.

Table 3. *Demographic Difference of HPV/HPV Vaccine Awareness*

Items		Heard of HPV n(%)	Heard of HPV vaccine n(%)	Heard of Cervical Cancer n(%)	Heard of Genital Warts n(%)
Age	≤21 years	59 (32.2)	39 (21.3)	171 (93.4)	79 (43.2)
	>21 years	74 (44.6)	56 (33.7)	162 (97.6)	116 (69.9)
		p=0.058	*p=0.032	p=0.158	***p=0.000
Sex	Male	49 (27.5)	27 (15.2)	166 (93.3)	108 (60.7)
	Female	83 (49.1)	67 (39.6)	165 (97.6)	86 (50.9)
		**p=0.001	**p=0.000	p=0.178	p=0.449
Level of Study	Undergraduate	70 (32.9)	50 (23.5%)	201 (94.4)	96 (45.1)
	Graduate	63 (46.7)	45 (33.3)	131 (97.0)	98 (72.6)
		*p=0.034	p=0.131	p=0.444	p=0.320
Length of Living in US	≤2 years	66 (45.5)	53 (36.6)	139 (95.9)	90 (62.1)
	>2years	67 (33.0)	42 (20.7)	194(95.6)	105 (51.7)
		p=0.052	**p=0.003	p=0.697	p=0.061
Class in Sex	Yes	67 (50.0)	50 (37.3)	132 (98.5)	83 (61.9)
	No	48 (27.4)	35 (20.0)	163 (93.1)	89 (50.9)
		**p=0.001	*p=0.013	p=0.255	*p=0.033
Relationship Status	Single	71 (33.3)	47 (22.1)	199 (93.4)	102 (47.9)
	Not single	59 (45.0)	41 (33.9)	129 (98.5)	89 (67.9)
		p=0.226	p=0.151	p=0.571	**p=0.005
Sexual Intercourse	Yes	60 (49.6)	44 (36.3)	120 (99.2)	85 (70.2)
	No	69 (31.2)	48 (21.7)	206 (93.2)	104 (47.1)
		**p=0.004	**p=0.009	*p=0.044	***p=0.000

* p<0.05 **p<0.01, ***P<0.001

Table 4. *Association of Knowledge and Demographics (n=350)*

	High Knowledge versus Low Knowledge*		
		OR(95%CI)	P
Age	≤21 years	1.136 (0.937-1.377)	p=0.192
	>21 years	1	
Sex	Female	1.255 (1.033-1.525)	*p=0.020
	Male		
Level of Study	Undergraduate	1.252 (1.252-1.543)	*p=0.029
	Graduate	1	
Length of Living in US	≤2 years	0.832 (0.680-1.019)	p=0.068
	>2years	1	
Class in Sex	Yes	0.693 (0.533-0.867)	**p=0.001
	No	1	
Relationship Status	Single	1.089 (0.890-1.334)	p=0.401
	Not single	1	
Sexual Intercourse	Yes	0.798 (0.642-0.993)	*p=0.034
	No	1	

* Median Score of 4.34 of HPV/HPV vaccination knowledge was used as the cut-off to determine the odds ratios. * $p<0.05$ ** $p<0.01$.

Table 5. *Intention of HPV Vaccination*

Vaccination against cervical cancer is now available, how likely is it that you will take the vaccine in the future?								
	Very unlikely n(%)	Unlikely n(%)	Somewhat unlikely n(%)	Undecided n(%)	Somewhat likely n(%)	Likely n(%)	Very likely n(%)	Mean (SD)
Male	35(19.7)	9(5.1)	29(16.3)	43(24.2)	36(20.2)	17(9.6)	9(5.1)	3.69(1.76)
Female	0(0.0)	3(1.8)	14(8.3)	35(20.7)	45(26.6)	26(15.4)	46(27.2)	5.27(1.37)
Total	35(10.0)	12(03.4)	43(12.3)	79(22.6)	81(23.1)	43(12.3)	56(16.0)	4.47(1.77)

*Pearson Chi-square X=74.911 p=0.000

Table 6. *Beliefs about HPV/HPV Vaccine*

Items: Who should be vaccinated?	Disagree n(%)		Somewhat disagree n(%)		Somewhat agree n(%)		Agree n(%)		Mean Score	SD
All women should be vaccinated against cervical cancer.	12	(03.4)	69	(19.7)	170	(48.6)	98	(28.0)	3.01	0.79
Normal health-conscious women should be vaccinated against cervical cancer.	9	(02.6)	34	(09.7)	148	(42.3)	159	(45.4)	3.31	0.75
Sexually active women should be vaccinated against cervical cancer.	8	(02.3)	9	(02.6)	92	(26.3)	238	(68.0)	3.61	0.66
Women with multiple sexual partners should be vaccinated against cervical cancer.	6	(01.7)	8	(02.3)	74	(21.1)	259	(74.0)	3.69	0.60
Women or girls who have never had sex should be vaccinated against cervical cancer.	17	(04.9)	54	(15.4)	134	(38.3)	142	(40.6)	3.16	0.86

Items: HPV infection stigma.	Unlikely n(%)		Somewhat unlikely n(%)		Somewhat likely n(%)		Likely n(%)		Mean Score	SD
If you are HPV infected, the infection is likely from your current partner.	25	(07.2)	27	(07.7)	170	(48.6)	124	(35.5)	3.14	0.84
If you are HPV infected, the relationship with your partner will end.	42	(12.0)	96	(27.4)	126	(36.0)	80	(22.8)	2.70	0.95
If you are HPV infected, your partner will suspect you of infidelity.	43	(12.3)	70	(20.0)	147	(42.0)	85	(24.3)	2.79	0.94
If you are HPV infected, your family will suspect you of sexual impropriety.	32	(09.2)	53	(15.1)	138	(39.4)	122	(34.9)	3.01	0.96
If you are HPV infected, friends will keep a distance from you.	58	(16.6)	95	(27.1)	138	(39.4)	54	(15.5)	2.54	0.95

Table 6. *Continued.*

Items: Family and partner's response.	Disagree n(%)		Somewhat disagree n(%)		Somewhat agree n(%)		Agree n(%)			
If you are to be vaccinated against cervical cancer, your partner's response will be:	3	(00.9)	25	(07.1)	131	(37.4)	181	(51.7)	3.44	0.67
If you are to be vaccinated against cervical cancer, your family's response will be:	2	(00.6)	43	(12.3)	107	(30.6)	188	(53.7)	3.41	0.73
Items: Influence for HPV vaccination.	**Very unwilling n(%)**		**Unwilling n(%)**		**Willing n(%)**		**Very willing n(%)**			
Imagine that some of your best friends have already had an HPV vaccination, how willing are you to also have it:	7	(02.0)	37	(10.6)	211	(60.3)	86	(24.6)	3.1	0.66
Imagine that your family members decide you should get the HPV vaccine, how willing are you to comply:	5	(01.4)	30	(08.6)	202	(57.7)	101	(28.9)	3.18	0.65
Imagine that your doctor decided you should get an HPV vaccination, how willing are you to comply:	2	(00.6)	11	(03.1)	192	(54.9)	134	(38.3)	3.35	0.57

Table 7. *Sex. Difference of HPV/HPV Vaccine Perception*

t-test for Who should be vaccinated?							
	N	Mean	Std. Deviation	t	df	95% CI	
All women should be vaccinated against cervical cancer.							
Male	178	3.05	0.776	0.949	345	-0.086	0.246
Female	169	2.97	0.798				
Normal health-conscious women should be vaccinated against cervical cancer.							
Male	179	3.3	0.741	-0.075*	346	-0.165	0.153
Female	169	3.31	0.764				
Sexually active women should be vaccinated against cervical cancer.							
Male	179	3.6	0.64	-0.327*	343	-0.162	0.116
Female	166	3.63	0.673				
Women with multiple sexual partners should be vaccinated against cervical cancer.							
Male	178	3.7	0.58	0.306	343	-0.109	0.148
Female	167	3.68	0.633				
Women or girls who have never had sex should be vaccinated against cervical cancer.							
Male	177	3.13	0.866	-0.587*	343	-0.237	0.128
Female	168	3.18	0.859				

t test for HPV infection stigma.							
	N	Mean	Std. Deviation	t	df	95% CI	
If you are HPV infected, the infection is likely from your current partner.							
Male	177	3.16	0.791	0.682	342	-0.117	0.241
Female	167	3.1	0.896				
If you are HPV infected, the relationship with your partner will end.							
Male	176	2.64	0.958	-1.538*	340	-0.362	0.044
Female	166	2.8	0.95				
If you are HPV infected, your partner will suspect you of infidelity.							
Male	176	2.93	0.911	2.732	341	0.078	0.48
Female	167	2.65	0.981				
If you are HPV infected, your family will suspect you of sexual impropriety.							
Male	176	2.99	0.907	-0.587*	341	-0.258	0.139
Female	167	3.05	0.962				
If you are HPV infected, friends will keep their distance from you.							
Male	176	2.57	0.965	0.577	341	-0.142	0.26
Female	167	2.51	0.924				

t-test for family and partner's response.							
	N	Mean	Std. Deviation	t	df	95% CI	
If you are to be vaccinated against cervical cancer, your partner’s response will be:							

Table 7. *Continued*

Male	174	3.4	0.687	-1.252*	336	-0.235	0.052
Female	164	3.49	0.651				
If you are to be vaccinated against cervical cancer, your family's response will be:							
Male	173	3.42	0.691	-0.025*	336	-0.158	0.154
Female	165	3.42	0.766				

t-test for Influence for HPV vaccination.

	N	Mean	Std. Deviation	t	df	95% CI	
Imagine that some of your best friends have already had an HPV vaccination, how willing are you to also have it:							
Male	174	2.98	0.649	-3.507*	337	-0.386	-0.109
Female	165	3.23	0.65				
Imagine that your family members decide you should receive the HPV vaccine, how willing are you to comply:							
Male	173	3.06	0.611	-3.504*	334	-0.38	-0.107
Female	163	3.31	0.66				
Imagine that your doctor decides you should receive an HPV vaccination, how willing are you to comply:							
Male	172	3.3	0.584	-1.661*	335	-0.227	0.019
Female	165	3.41	0.562				

* $p<0.01$ **$p<0.01$

Table 8. *Multiple Regression Analysis of belief Variance of Vaccination Intention*

Model	B	Beta	t
All women should be vaccinated against cervical cancer.	-0.047	-0.02	-0.26
Normal health-conscious women should be vaccinated against cervical cancer.	-0.03	-0.013	-0.15
Sexually active women should be vaccinated against cervical cancer.	0.203	0.072	0.88
Women with multiple sexual partners should be vaccinated against cervical cancer.	-0.231	-0.074	-1.031
Women or girls who have never had sex should be vaccinated against cervical cancer.	0.206	0.098	1.407
If you are HPV infected, the infection is likely from your current partner.	0.182	0.085	1.563
If you are HPV infected, the relationship with your partner will end.	0.053	0.028	0.484
If you are HPV infected, your partner will suspect you of infidelity.	-0.187	-0.099	-1.511
If you are HPV infected, your family will suspect you of sexual impropriety.	0.148	0.078	1.163
If you are HPV infected, friends will keep their distance from you.	-0.012	-0.006	-0.1
If you are to be vaccinated against cervical cancer, your partner's response will be:	0	0	-0.001
If you are to be vaccinated against cervical cancer, your family's response will be:	-0.096	-0.039	-0.514
Imagine that some of your best friends have already had an HPV vaccination, how willing are you to also have it:	0.758	0.282	3.227*
Imagine that your family members decide you should receive the HPV vaccine, how willing are you to comply:	0.541	0.193	2.054
Imagine that your doctor decides you should receive an HPV vaccination, how willing are you to comply:	-0.033	-0.011	-0.153
r2=0.256 (n=321).			

Notes: a. Dependent Variable: Vaccination Intention; b. * $p<0.01$

Table 9. *Multiple Regression Analysis of Demographic Variables of Vaccination*

Model	B	Beta	t
Age	0.137	0.189	1.016
Sex	1.726	0.529	5.999**
Year of College	-0.119	-0.096	-0.553
Time living in US	-0.087	-0.04	-0.425
Class in Sexuality	0.291	0.119	1.375
Religious	0.071	0.054	0.636
Relationship Status	-0.124	-0.071	-0.797
Sexual Partners	0.011	0.046	0.046
r2=0.230 (N=321)			

Notes: a. Dependent Variable: Vaccination Intention; b. * $p<0.001$

Table 10. *Axial Coding of Awareness and Knowledge*

Element	Description
Cervical Cancer	Organ, Breast cancer, Cancers
Cause of cervical cancer	Gynecological diseases, "Duo Tai", "Liu Chan", Life style, Unclean sex life
Genital warts-information resources	Electronical pole, Street advertisement,
Genital Warts	secret diseases, dirty diseases
Causes of genital warts	"Xing Bing", "Lan Jiao", Promiscuous
HPV vaccine-information resources	Hospital, Website, Friends
HPV and Breast Cancer	Nipple, "Ru Tou", "Nipple Like", Breast

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APPENDICES

Appendix A Survey Questionaire

人乳头瘤病毒以及人乳头瘤病毒疫苗相关知识，看法和行为的调查

HPV AND HPV VACCINE RELATED KNOWLEDGE, BELIEF AND BEHAVIORS QUESTIONNAIRE

人口统计信息 Demographic Information

1. 您的年龄: How old are you?_____

2. 您的性别：What is your sex?
   - □ 男 Male
   - □ 女 Female
   - □ 不回答 Prefer not to answer

3. 请问您大学几年级? What is your year of college?
   - □ 大一 Freshman
   - □ 大二 Sophomore
   - □ 大三 Junior
   - □ 大四 Senior
   - □ 研究生 Graduate

4. 您来美国学习的时间? How long have you been living in the United States?
   - □ ≤2年≤2 year
   - □ 2-4年2-4 years
   - □ ≥ 4年2-4 years

6. 您以前是否上过性教育的课程? Have you ever had a class in human sexuality?
   - □ 是 Yes
   - □ 否 No
   - □ 不确定 Not sure

7. 您的宗教信仰是? What is your religious preference?
   - □ 佛教 Buddhist
   - □ 天主教 Catholic
   - □ 伊斯兰教Muslim
   - □ 基督教 Protestant
   - □ 没有宗教信仰None
   - □ 其他，请注明: Other, specify:_____

8. 您是否在美国有健康保险? Do you have health insurance in the United States?

□ 是Yes
□ 否No
□ 不知道I don’t know

HPV and HPV vaccine Knowledge
人乳头瘤病毒和疫苗的知识

1. 您是否听说过人乳头瘤病毒 (Human Papillomavirus -HPV)? Have you heard of Human Papillomavirus (HPV)?

□ 是 Yes
□ 否 No
□ 不知道I don’t know

2. 您是否听说过人乳头瘤病毒的疫苗? Have you heard of HPV vaccine?

□ 是 Yes
□ 否 No
□ 不知道I don’t know

3. 您是否听说过宫颈癌? Have you heard of Cervical Cancer?

□ 是 Yes
□ 否 No
□ 不知道 I don’t know

4. 您是否听说过生殖道尖锐湿疣（湿疣）？ Have you heard of Genital Warts?

□ 是 Yes
□ 否 No
□ 不知道 I don’t know

*请用“正确”， “错误” 或者“不知道”来判断下面的陈述，
请选择不知道如果你没有相关知识。* Please read each statement below and answer whether you believe it is "true" or "false." Please choose "I don’t know” if you do not know the answer.

	正确 True	错误 False	不知道 I don’t know
1.人乳头瘤病毒（HPV) 感染可以引起尖锐湿疣 HPV can cause genital warts			
2. HPV 感染可以引起宫颈癌 HPV can cause cervical cancer			
3.人可以感染了HPV却不知道 A person may be infected with HPV, but not know it			
4. 安全套的使用可以完全阻止HPV 感染 Using a condom can totally prevent HPV infection			
5. 只有一定亚型的HPV可以引起宫颈癌 Only certain types of HPVs cause cervical cancer			
6.HPV可以由性行为传播 HPV can be sexually transmitted			
7. 任何人以前有过性行为都有感染HPV的危险 Anyone who has had sex is at risk of HPV infection			
8.有多个性伴侣增加了宫颈癌的危险 Having multiple sexual partners increases the chance of getting cervical cancer			
9.HPV 疫苗是一种预防宫颈癌的方法 HPV vaccination is a way to prevent cervical cancer			
10.女性接种过疫苗之后不再需要常规的预防宫颈癌的宫颈刮片检查。 Women who receive the HPV vaccine do not need to undergo routine (Pap smears/test) screening tests for cervical cancer.			
11. 宫颈癌可以百分百预防宫颈癌 Vaccination is 100% effective for preventing cervical cancer			
12. 男性也可以接种HPV疫苗 Man can also receive the HPV vaccine			
13. 请在这一栏选择“错误” Please check “False” for this item			

NOTE: A “No return response” function was set up online so that the respondents were not able to go back to Knowledge questions to change the answers after they hit the “next” button and saw the introduction of HPV/HPV vaccine on the subsequent page.

人乳头瘤病毒(HPV) 以及人乳头瘤病毒 (HPV) 疫苗相关知识

*请在回答下一个问题之前，阅读下面的HPV 及 HPV 疫苗信息。

关于人乳头瘤病毒 (HPV)

- HPV 是一组病毒。不同的亚型，不同的传播途径，可以导致不同的疾病，例如生殖道尖锐湿疣和皮肤湿疣。
- 一些高危的HPV 亚型被证明可以引起宫颈癌。 这些高危型一般是通过性行为传播的。
- 男性和女性都可以感染HPV, 却不察觉。
- 多个性伴侣可以增加HPV的感染几率。

关于人乳头瘤病毒 (HPV)疫苗

- 疫苗可以帮助提高身体的免疫力对抗特定的疾病。例如，幼儿时接种的麻疹疫苗。
- 现有的HPV疫苗可以预防四个亚型的HPV病毒。此疫苗可以提高身体对高危HPV病毒的免疫力,从而达到降低宫颈癌的危险。
- 现有的HPV疫苗可以有效预防70%的宫颈癌， 90%的生殖器尖锐湿疣。
- HPV疫苗是预防性的疫苗，应该在高危HPV感染之前进行接种。
- 男性和女性都可以接种HPV疫苗。

Fact about HPV infection and HPV vaccine

*Please read the following information about HPV and HPV vaccine before you move to the next question.

Facts about HPV

- HPVs are a group of viruses. Different HPV strains, through different transmission modes, cause different diseases such as genital warts and skin warts
- Some HPVs are called high-risk HPVs because they are known to cause cervical cancer. These high-risk HPVs are mostly transmitted sexually
- Men or women may be infected with HPV, but not know it
- Having multiple sexual partners increases the risk of HPV infection.

Facts about vaccination

- Vaccination helps raise the body’s defenses to fight against certain diseases, for example, vaccination against measles during infancy
- Vaccination against four strains of HPV infection is now available. The vaccines help raise the body’s defenses against high-risk HPVs, decreasing the risk of cervical cancer.
- The current vaccines are 70% effective for preventing cervical cancer, 90% effective for preventing genital warts.
- These are prophylactic vaccines; they should be given before high-risk HPV infection takes place
- The vaccine is available currently for both female and male.

*请回答下面的问题，每个问题请只选择一个答案。
*When answering the following questions, please check only one answer for each question.

人乳头瘤病毒疫苗接种和接种意愿

HPV vaccination status and intention of HPV vaccination

1. 你是否接种过一针或者多于一针的HPV 疫苗? Have you received one or more shots of HPV vaccine?

- □ 否(请继续回答下面的问题) No (Continue answering)
- □ 是 (请跳过第二个问题，接着回答下面的问题）Yes (Please skip Question 2, continue answering the next question)

2. 现在已有了可以预防宫颈癌的疫苗，有多少可能你会接种此疫苗？Vaccination against cervical cancer is now available; how likely is it that you will receive the vaccine in the future?

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能 Likely
- □ 非常可能Very likely

对HPV感染和疫苗的看法
Beliefs about HPV infection and HPV vaccine

1. 所有的女性都应该接种HPV疫苗用来预防宫颈癌。All women should be vaccinated against cervical cancer.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

2. 正常的有健康观念的女性应该接种HPV疫苗用来预防宫颈癌。 Normal health-conscious women should be vaccinated against cervical cancer.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

3. 性生活活跃的女性应该接种HPV疫苗用来预防宫颈癌。Sexually active women should be vaccinated against cervical cancer.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

4. 多个性伴侣的女性应该接种HPV疫苗用来预防宫颈癌。Women with multiple sexual partners should be vaccinated against cervical cancer.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

5. 没有发生过性行为的女性和女孩应该接种HPV疫苗用来预防宫颈癌。Women or girls who have never had sex should be vaccinated against cervical cancer.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

6. 假如你感染了HPV,你认为此感染可能来自你的性伴侣？ If you are HPV infected, the infection is likely from your current partner.

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能Likely
- □ 非常可能Very likely

7. 假如你感染了HPV, 你和你伴侣的关系就会结束？ If you are HPV infected, the relationship with your partner will end.

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能Likely
- □ 非常可能Very likely

8. 假如你感染了HPV,你的伴侣会怀疑你的忠诚？ If you are HPV infected, your partner will suspect you of infidelity.

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能Likely
- □ 非常可能Very likely

9. 假如你感染了HPV,你家人会怀疑你有不正当的性行为？ If you are HPV infected, your family will suspect you of sexual impropriety.

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能Likely
- □ 非常可能Very likely

10. 假如你感染了 HPV,你的朋友会疏远你？ If you are HPV infected, friends will keep their distance from you.

- □ 非常不可能Very unlikely
- □ 不可能Unlikely
- □ 不太可能Somewhat unlikely
- □ 有可能Somewhat likely
- □ 可能Likely
- □ 非常可能Very likely

11. 如果你想接种 HPV 疫苗，你伴侣的反应会是？ If you are to be vaccinated against cervical cancer, your partner's response will be:

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

12. 如果你想接种HPV疫苗，你家人的反应会是？ If you are to be vaccinated against cervical cancer, your family's response will be:

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

13. 假如，一些你的朋友已经接种了HPV疫苗，你是否乐意也接种此疫苗？Imagine some of your best friends received an HPV vaccination, how willing are you also to have it:

- □ 非常不乐意Very unwilling
- □ 不乐意Unwilling
- □ 乐意Willing
- □ 非常乐意Very willing

14. 假如，你的家人决定你应该接种HPV疫苗，你是否乐意服从？Imagine your family members decide you should receive an HPV vaccine, how willing are you to comply:

- □ 非常不乐意Very unwilling
- □ 不乐意Unwilling
- □ 乐意Willing
- □ 非常乐意Very willing

15. 假如，你的医生决定你应该接种HPV疫苗，你是否乐意服从？Imagine your doctor recommends that you receive an HPV vaccination, how willing are you to comply:

- □ 非常不乐意Very unwilling
- □ 不乐意Unwilling
- □ 乐意Willing
- □ 非常乐意Very willing

16. 叫HPV疫苗抗癌疫苗是可以的。Calling HPV vaccine an anti-cancer vaccine is acceptable.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

17. . 叫HPV疫苗性病疫苗是可以的。 Calling HPV vaccine a STD vaccine is acceptable to me.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

18. 强制所有的留学生接种HPV疫苗是可以的。Mandating HPV vaccine for all international students is acceptable to me.

- □ 不同意Disagree
- □ 不太同意Somewhat disagree
- □ 有点同意Somewhat agree
- □ 同意Agree

性行为历史
Sexual History and Sexual Behaviors

1. 你现在的婚恋状况是? What is your relationship status?
   - □ 单身Single
   - □ 约会Dating
   - □ 丧偶Widowed
   - □ 分居Separated
   - □ 已婚Married

2. 您以前有过性交行为吗？Have you ever had sexual intercourse?
   - □ 是Yes
   - □ 否No (you have completed the survey)

3. 您以前的性行为对象有Have you had sex with...
   - □ 女性Women
   - □ 男性Men
   - □ 男性和女性Both women and men

4. 您第一次性交时的年龄？How old were you when you had sex for the first time? _____ 岁years old

5. 您一生中已有多少个性伴侣？How many sexual partners have you had in your lifetime? _____

6. 您在最近的一年中有多少个性伴侣？How many sexual partners have you had in the past 12 months? _____

8. 您在来美国前有多少个性伴侣？How many sexual partners did you have before you came to US? _____

9. 您在来美国后有多少个性伴侣？How many new sexual partner(s) have you had you came to the United States? ____
(注意： 来美国前后的性伴侣之和应该等于问题5的答案。Note: The number of sexual partners before AND after coming to the United States should equal the number of sexual partners in your lifetime)

10. 您用什么方法来预防性传染的疾病？（请选择所有对的答案）What methods did you use to prevent STDs? (Check all that apply)

- □ 安全套 Condoms
- □ 禁欲 Abstinence
- □ 单一性伴侣 Monogamy (have only one partner)
- □ 长期的性关系 Long-term relationship (over a few years)
- □ 其他，请说明 Other, specify: _____
- □ 不回答 Prefer not to answer

11. 如果您使用安全套，请估计在性行为中您使用安全套的频率？ If you use condoms, please estimate how often you used condoms in your sexual behavior?

- □ 75% 以上/More than 75%
- □ 51-75%
- □ 26-50%
- □ 少于/Less than 25%
- □ 近三个月内无性行为 I did not have sex in the past 3 month
- □ 此问题不适于我/Not applicable

12. 您是否被诊断过某种性病？（请选择所有对的答案）Have you ever been diagnosed with any STD? (Check all that apply)

- □ 淋病Gonorrhea
- □ 支原体感染Chlamydia
- □ 梅毒Syphilis
- □ 生殖器疱疹Genital herpes
- □ 人乳头瘤病毒或者生殖道尖锐湿疣Human Papillomavirus (HPV) and/or genital warts
- □ 其他，请注明Other, specify:_____
- □ 我从来没有被诊断过性病I have not been diagnosed with any STD

13. 您最近的恭敬刮片结果是什么？What were the results of your most recent Pap smear?

- □ 正常Normal
- □ 不正常Abnormal
- □ 我没有做过宫颈刮片检查I have not had a Pap smear
- □ 我不知道宫颈刮片检查是什么I don't know what a Pap smear is
- □ 不回答Prefer not to answer
- □ 此问题不使用于我（男性）Not applicable（male)

14. 如果您有其他的评论或者问题，请写在下放的空格内： If you have additional comments, please write them in the box below:

非常感谢您的参与！Thank you so much for your participation!

Appendix B Survey Email Invitation

网上问卷的邮件邀请函

邮件标题: 中国留学生关于HPV和HPV疫苗的知识和看法
正文:
亲爱的中国留学生：
我是普度生命和运动系的博士生，高海娟。我的研究方向是人乳头瘤病毒的感染和疫苗。这封邮件是诚恳的邀请您参加我的网上调查问卷。问卷的目的是了解中国留学生对人乳头瘤病毒(HPV)及 HPV 疫苗的相关知识和看法。您的回答是完全匿名的。无任何可以查找您本人的个人信息和网络信息会被记录。没有任何的风险会将您的回答和您本人联系在一起。参与此调研完全自愿。您会在答卷的过程中学习到 HPV 感染和 HPV 疫苗的相关知识。您的回答会帮助研究人员对于中国留学生的健康问题提供答案。项目负责人的主要负责人是 Gerald C. Hyner 教授。

此网上问卷从次日起可以在任何一台电脑进入回答。此问卷只占用您约15分钟的时间。更多的信息请进入问卷得知。

如果您对此研究感兴趣，请点击此处问卷链接.
一个新的网页窗口会随之打开，您首先会看到简短的网上调研信息表。

接下来会有两个提醒您完成问卷的邮件。如果您不想再接受此邮件，请回复此邮件并点击“停止发送邮件”。

非常感谢您的参与！

高海娟
Haijuan Gao, PhD Student
Department of Health and Kinesiology
Purdue University
Lambert Hall, Room 304
800 W. Stadium Ave.West
Lafayette, IN 47907
Email:gao17@purdue.edu

项目负责人： Gerald C. Hyner 教授
邮箱：hyner@purdue.edu.

EMAIL INVITATION FOR PARTICIPATION IN THE ONLINE ANONYMOUS SURVEY

Email Invitation For Participation in The Online Anonymous Survey
E-Mail Title:
What Chinese International Students Know, Think, and Do about HPV and HPV Vaccine

Text:
Dear Chinese international Students:

My name is Haijuan Gao and I am a Ph.D candidate in the Health and Kinesiology department at Purdue University, currently working on my dissertation. I am conducting research about HPV (Human Papillomavirus) and HPV vaccine. The purpose of the study is to examine what Chinese international students know, think, and do about HPV and HPV vaccine. This study has been approved by the Purdue Institutional Research Board. The principal investigator of this project is Professor Gerald C. Hyner.
This e-mail is to invite you to participate in the study by completing a short online survey. If you don't know about this topic, you will learn a lot during the survey process. Your participation is voluntary. Your response will be totally anonymous. No connection between you and your answer could be linked. The survey will not collect any personally identifying information and computer IP addresses. Your responses will help the researcher to have better understanding of the research topic that will lead to development of a more appropriate HPV prevention programs for this specific population.

The survey will be available online for a period of time from the date of this e-mail, and can be completed from any computer with internet access at a time that is convenient for you. It will take about 15 minutes. There are no direct benefits to you as a participant in this study; however, you will find an educational section regarding HPV infection and HPV vaccination. Further information will be found inside the survey.

We will be emailing out three reminders to you in about one and two weeks. If you wish to be removed from the research study reminder list, please reply to this message with the words "no e-mail" in the subject line, or send an email to gao17@purdue.edu.

Appendix C Email Reminder

网上问卷的邮件邀请提醒函

邮件标题: 中国留学生关于HPV和HPV疫苗的知识和看法
正文:
亲爱的中国留学生，

这是第二封邀请您参与与中国留学生健康相关的网上问卷。问卷的目的是了解中国留学生对人乳头瘤病毒(HPV)及HPV疫苗的相关知识和看法。

如果您已经完成的问卷，请忽略这封邮件。我们再次感谢您的参与。如果您还没有参加我们的问卷，诚且的邀请您的参加。请帮助我们完成一个简短约15分钟的网上问卷调查。您的回答是完全匿名的。无任何可以查找您本人的个人信息和网络信息会被记录。没有任何的风险会将您的回答和您本人联系在一起。参与此调研完全自愿。您会在答卷的过程中学习到HPV感染和HPV疫苗的相关知识。您的回答会帮助研究人员对于中国留学生的健康问题提供答案。

如果您对此研究感兴趣，请点击***此处问卷链接.***
一个新的网页窗口会随之打开，您首先会看到简短的网上调研信息表。

接下来会有一个提醒您完成问卷的邮件。如果您不想再接受此邮件，请回复此邮件并点击“停止发送邮件”。

非常感谢您的参与！

高海娟 博士生
Haijuan Gao, Ph.D student
Department of Health and Kinesiology
Purdue University
Lambert Hall, Room 304
800 W. Stadium Ave.West
Lafayette, IN 47907
(765) 418-6637
Email:gao17@purdue.edu

项目负责人： Gerald C. Hyner 教授
邮箱：hyner@purdue.edu.

EMAIL REMINDER

Email Reminder to Participate of the Online Survey

Email Title: Complete HPV survey, Learn about HPV vaccine
Text:
Dear Chinese international Students,

We recently invited you to participate in an important online research study**.** The purpose of the study is to examine what college women know, think, and do about HPV and HPV vaccine.

If you have already completed the survey, we greatly appreciate your time and cooperation. If you have not completed the survey, we would greatly appreciate your input. We are seeking your support in conducting this short, one-time survey. The survey may take about 15 minutes to complete. Your participation is voluntary. Your response will be anonymous. The survey will not collect any personally identifying information and computer IP addresses
will not be collected.

The survey will be available online for 3 more weeks, and can be completed from any computer with internet access at a time that is convenient for you. We will be emailing out another reminder to you in about one week. If you wish to be removed from the research study reminder list, please reply to this message with the words “no e-mail” in the subject line, or send an email to gao17@purdue.edu.

If you are interested in completing the survey, please click ***this link***. A browser window will open to the survey, which starts with an informed consent page.

Thank you for your participation,

Co-investigator: Haijuan Gao, Ph.D student
Department of Health and Kinesiology
Purdue University
Lambert Hall, Room 304
800 W. Stadium Ave.West
Lafayette, IN 47907
(765) 418-6637
Email:gao17@purdue.edu

Principle investigator: Professor. Gerald C. Hyner.
contact information: hyner@purdue.edu.

Appendix D Online Survey Participant Information Sheet

网上调研参与信息表
中国留学生对HPV和HPV疫苗的知识和看法
主要研究者：Dr. Gerald C. Hyner & 高海娟
普度大学
生命运动系

如果您是来自中国大陆的留学生（不包括香港和台湾地区），年龄18岁及以上，目前就学于普度，欢迎您参加我们的调研。请阅读如下信息，如对我们的研究有任何问题，请联系 Dr Gerald C. Hyner 或者助理研究员高海娟。

研究目的：本研究是为了调研中国留学生对人乳头瘤病毒(HPV)及HPV疫苗的相关知识和看法。

具体步骤：您只需要回答此网上调查问卷。
我们会询问您HPV相关的知识，看法和一些个人信息。

参与时间：此问卷只占用您约15分钟的时间。

风险：对您没有超过最低限度的任何风险。可能在您答卷的过程中有泄露身份的危险，我们已经采取很多措施来降低这种风险。请您确保在答卷过程中无人观看。

收益：对您本身并无特殊收益，您会在答卷的过程中学习到HPV感染和HPV疫苗的相关知识。

保密：此问卷是完全匿名保密的。没有任何的风险会将您的回答和您本人联系在一起。此科研记录可能会被普度相关部门审核，监督。所有的调查结果会被安全保管。您的回答会被用于科学研究以及发表。

参与的自愿性：参与此调研完全自愿。如果您同意参与答卷，您可以随时退出无任何后果。您可以跳过任何您不想回答的问题。

联系信息Contact Information:
如果您有任何问题，请联系高海娟（助理研究员），电话：765-4186637。邮箱：gao17@purdue.edu. 您还可以联系项目负责人：Professor Gerald C. Hyner， 邮箱：hyner@purdue.edu. 如果你有其他的问题，请联系Institutional Review Board（普度大学）,地址： Ernest C. Young Hall, Room 1032, 155 S. Grant St., West Lafayette, IN 47907-2114. 电话： (765) 494-5942. 邮箱：irb@purdue.edu.

点击下一页进入问卷，同时同意您已阅读次信息表格，对此研究无相关问题并且准备好参与答卷。

ONLINE SURVEY PARTICIPANT INFORMATION SHEET
What Chinese International Students Know, Think, and Do
about HPV and HPV Vaccine.
Principle investigator: Dr. Gerald C. Hyner
Purdue University
Department of Health and Kinesiology

You need to fulfill this following criteria to join our study: Chinese international students (mainland China Only, exclusive Taiwan and Hong Kong), age 18 years and above, currently studying at Purdue University, Indiana. We request that you read this form and ask any questions you may have before agreeing to be in the study. The principal investigator of this study is Dr. Gerald C. Hyner and the co-investigator is Haijuan Gao Purpose of Research The purpose of this study is to learn Chinese International Students' knowledge and beliefs of HPV infection and HPV vaccination.

Specific Procedures You will need to complete a short online survey. We will ask your current knowledge, intention and beliefs regarding HPV vaccination. There will also be questions asking about your sexual experience.

Duration of Participation The survey may take about 15 minutes to complete.

Risks There will be no more than minimum risk to you. There might be risk of a breach in confidentiality. We have taken a lot of steps to minimize the risk.

Benefits There are no direct benefits to you as a participant in this study; however, you will receive an educational section of HPV infection and HPV vaccination during the survey.

Confidentiality This survey is totally anonymous. No connection between you and your survey result could be linked. The project's research records may be reviewed by departments at Purdue University responsible for regulatory and research oversight. All survey result will be stored in the research computer of the investigators. Your survey result will be used at a later date for publication.

Voluntary Nature of Participation
You do not have to participate in this survey. If you agree to participate you can withdraw your participation at any time without penalty. You could also skip any question that makes you feel uncomfortable or do not want to answer.

Contact Information:
If you have any questions about this research project, you can contact Haijuan Gao, the co-investigator of the study, phone number: 765-418 6637, email: gao17@purdue.edu.

For further concern, please contact principle investigator Professor Gerald C. Hyner, Email: hyner@purdue.edu. If you have concerns about the treatment of research participants, you can contact the Institutional Review Board at Purdue University, Ernest C. Young Hall, Room 1032, 155 S. Grant St., West Lafayette, IN 47907-2114. The phone number for the Board is (765) 494-5942. The email address is irb@purdue.edu.

By proceeding to the next page you agree to having had the opportunity to read this information sheet, ask questions about the research project, and are prepared to respond to the items in the survey.

Appendix E Email Invitation For Participation In Focus Group Discussion

研究小组讨论会邮件邀请

邮件标题: HPV疫苗小组讨论邀请

正文:

亲爱的中国留学生，

我是普度生命和运动系的博士生，高海娟。我的研究方向是人乳头瘤病毒的感染和疫苗。问卷的目的是了解中国留学生对人乳头瘤病毒(HPV)及 HPV 疫苗的相关知识和看法。您会在参与的过程中学习到 HPV 感染和 HPV 疫苗的相关知识。您的回答会帮助研究人员对于中国留学生的健康问题提供答案。项目负责人的主要负责人是 Gerald C. Hyner 教授。

您可能已经收到过我的邮件，关于HPV 疫苗的网上调查问卷.
这封邮件是邀请您参加这个项目的后续的小组讨论。您将和其他的中国留学生一起讨论相关的问题，分享您的想法和意见。由于是小组讨论，您可以拒绝回答任何人提出的可能会涉及到您个人的敏感信息的问题。这次的小组讨论可能占用您一到两个小时的时间，讨论会被录音。但是录音和您的个人信息会在小组讨论后立即切断。 小组讨论会在普度校园内进行。预计时间会在暑假或者2013秋季学期。
本次参与完全自愿。即使您现在同意参加也可以随时中止参与，无任何后果。

为了弥补您参与研究的时间，每位参与者可以得到15美金，并且我们将在讨论时间中提供披萨。

如果您有进一步的问题，请联系电话 (765)-4186637 或者恢复此邮件地址: gao17@purdue.edu.

非常感谢您的参与!

高海娟
Haijuan Gao, MD
Department of Health and Kinesiology
Purdue University
Lambert Hall, Room 304
800 W. Stadium Ave.West
Lafayette, IN 47907
(765) 418-6637
Email:gao17@purdue.edu

项目负责人：Gerald C. Hyner 教授
邮箱：hyner@purdue.edu.

EMAIL INVITATION FOR PARTICIPATION IN FOCUS GROUP DISCUSSION

Email Invitation for Participation in Focus Group Discussion

E-Mail Title: HPV Vaccine Group discussion participation

Text:
Dear Chinese international Students:

My name is Haijuan Gao and I am a Ph.D candidate in Health and Kinesiology department at Purdue University, currently working on my dissertation. I am conducting a research about HPV (Human Papillomavirus) and HPV vaccine. The purpose of the study is to explore Chinese international students' knowledge and belief of HPV vaccination. This study has been approved by the Purdue Institutional Research Boards. The principal investigator of this project is Professor. Gerald C. Hyner.

You might already received my email about participating a survey titled as "What Chinese International Students Know, Think, and Do about HPV and HPV Vaccine". This e-mail is to invite you to participate in the follow up study of focus group discussion. You will join the group discussion of other Chinese internationals students and further shared your opinions of HPV vaccination. Since it is small group discussion, your involvement to the discussion might reveal some personal and sensitive information. But you have the right not to answer questions raised by the investigator or other group members that makes you feel uncomfortable. The focus group discussion might request 1 to 2 hours from you. The discussion will be audio recorded, but the connection between you and the audio record will be de-identified later. It will be conducted within campus during the summer and fall semester. You do not have to participate in this focus group discussion. If you agree to participate you can withdraw your participation at any time without penalty.

You will be compensated with 15 dollars and personal pizza for your time of participation. Please reply to this email to Haijuan if you could participate.
If you have further questions, please call (765)-4186637 or reply to this email address: gao17@ purdue.edu.

Your participation is deeply appreciated.

Haijuan Gao, MD
Department of Health and Kinesiology
Purdue University
Lambert Hall, Room 304
800 W. Stadium Ave.West

Lafayette, IN 47907
(765) 418-6637
Email:gao17@purdue.edu
Principal investigator: Professor. Gerald C. Hyner.
contact information: hyner@purdue.edu.

Appendix F Focus Group Discussion Consent Form

FOCUS GROUP DISCUSSION PARTICIPANT
INFORMATION SHEET
Exploring the knowledge and beliefs of HPV vaccination
among US Chinese international students
Principle investigator: Dr. Gerald C. Hyner
Co-investigator: Haijuan Gao
Purdue University
Department of Health and Kinesiology

Purpose of Research The purpose of this study is to learn about Chinese International Students' knowledge and beliefs of HPV infection and HPV vaccination.

Specific Procedures You will join the group discussion of 6 Chinese international Students. The researcher will lead the discussion by asking questions and then open the discussion for everybody in the group. The discussion you participate in will be audio-recorded.

Duration of Participation The focus group discussion might last 1 to 2 hours. This focus group discussion will be conducted in a conference room on campus.

Risks There is no greater than minimum risk for you. The main risk is a breach in confidentiality; but we have taken some steps to minimize the risk (please refers to the confidentiality section).

Benefits There is no direct benefits to taking part in this study.

Compensation You will receive 15 dollars at the end of discussion to compensate you for your time of participation.

Confidentiality This consent form will be locked in the office drawer of the investigator. No other people could linked your personal information with the discussion beyond your research group members. The researcher could not prevent your group members to reveal the conversation during the group discussion. The audio record will be transcribed and destroyed three years later. Any personally identifying information on the audio will be removed during transcription. Transcriptions will be stored indefinitely in researcher's password secured computer. Your de-identified discussion record will be used for further publication. This project's research may be reviewed by and by departments at Purdue University responsible for regulatory and research oversight.

Voluntary Nature of Participation You do not have to participate in this research project. If you agree to participate you can withdraw your participation at any time without

penalty. You can skip any question that makes you feel uncomfortable; or you do not want to answer.

Contact Information: If you have any questions about this research project, you can contact Haijuan Gao, the co-investigator phone number: 765-418 6637, email: gao17@purdue.edu. For further concern, please contact the principal investigator Professor Gerald C. Hyner, Email: hyner@purdue.edu. If you have concerns about the treatment of research participants, you can contact the Institutional Review Board at Purdue University, Ernest C. Young Hall, Room 1032, 155 S. Grant St., West Lafayette, IN 47907-2114. The phone number for the Board is (765) 494-5942. The email address is irb@purdue.edu.

Documentation of Informed Consent
I have had the opportunity to read this consent form and have the research study explained. I have had the opportunity to ask questions about the research project and my questions have been answered. I am prepared to participate in the research project described above. I will receive a copy of this consent form after I sign it.

_____
_____
Participant's Signature Date

_____
Participant's Name

_____
_____
Researcher's Signature Date

研究小组讨论会信息表
中国留学生对HPV和HPV疫苗的知识和看法
主要研究者：Dr. Gerald C. Hyner
参与研究者： 高海娟
普度大学
生命运动系

如果您是来自中国大陆的留学生（不包括香港和台湾地区），年龄18岁及以上，目前就学于普度， 欢迎您参加我们的调研。

研究目的：本研究是为了调研中国留学生对人乳头瘤病毒(HPV)及HPV疫苗的相关知识和看法。

具体步骤：您会于其他五位中国留学生一起参加小组讨论。研究人员会通过问问题的方式组织全组讨论。您所参与的小组讨论会被录音。

参与时间：小组讨论大约会持续1到2个小时。小组谈论会在学校的会议室举行。

风险：对您没有超过最低限度的风险。最大的风险是保密。我们会采取一切的措施减低您的风险。

收益：对您不会有直接受益。

补偿： 您会在小组讨论后领取15美金做为对您时间的补偿。

保密：此同意表会被锁在办公室的抽屉内，除了您的小组成员外，没有其他的人可以把您个人信息与此次讨论联系起来。研究人员不能防止您的同组人员泄露此次讨论的信息。讨论的录音会在三年后被销毁。在销毁前，您的录音会被翻译成笔录。在翻译的过程中，任何与您个人信息的资料会被销毁。翻译的笔录会被一直存放在研究人员的工作电脑内，有密码保存。您的谈论记录从此会被用于以后的研究发表。此科研记录可能会被普度相关部门审核，监督。所有的调查结果会被安全保管。

参与的自愿性：参与此调研完全自愿。如果您同意参与答卷，您可以随时退出无任何后果。您可以自由选择愿意或者不愿意回答任何问题。

联系信息：
如果您有任何问题，请联系高海娟（助理研究员），电话：765-4186637。邮箱：gao17@purdue.edu. 您还可以联系项目负责人：Professor Gerald C. Hyner， 邮箱：hyner@purdue.edu. 如果你有其他的问题，请联系Institutional Review Board（普度大学）,地址： Ernest C. Young Hall, Room 1032, 155 S. Grant St., West Lafayette, IN 47907-2114. 电话： (765) 494-5942. 邮箱：irb@purdue.edu.

我已经阅读此同意书，并且接受过对此研究的解释说明。我有想研究人员问问题的机会，并且相关可能的问题已被回答和解决。我准备好参与此次研究。在签名之后，我会得到一份此同意书的拷贝。

_____
_____
参与人员签名　　日期

_____
参与人员姓名

_____
_____
研究员签名　　日期

Appendix G Focus Group ID Assignment and Demographic Form

Focus Group ID Assignment and Demographic Form
HPV 疫苗谈论小组参与人员信息

您好，
欢迎您来到 HPV 疫苗讨论小组，在讨论开始之前，请在下表如实填写您的人口统计信息。只有研究人员有查阅此信息的权限。为了保护你个人隐私，我们建议您在小组讨论始末一直使用此表随即给于您的名字代码
“A”。此次 6 位小组成员的代码分别是: “ B” “C” “D” “ E” “ F”。

Hello,
Welcome to the HPV vaccine focus group discussion. Before we start, please fill out your basic information in this short survey. To protect your privacy, we suggest you use pseudo name during the discussion. Your code name in this discussion group is “ A”. Your group members’ name are similar to yours, as “B”, “C”, “D”, “E”, “F”.

人口统计信息 Demographic Information

1. 您的年龄: How old are you?_____

2. 您的性别：What is your sex?

- □ 男 Male
- □ 女 Female

3. 请问您大学几年级? What is your Year of College?

- □ 大一 Freshman
- □ 大二 Sophomore
- □ 大三 Junior
- □ 大四 Senior
- □ 研究生 Graduate

4. 您来美国学习的时间? How long have you living in US?
_____年 year/years

6. 您以前是否上过性教育的课程? Have you ever had a class in human sexuality?

- □ 是 Yes
- □ 否 No
- □ 不确定 Not sure

7. 您的宗教信仰是? What is your religious preference?

- □ 佛教 Buddhist
- □ 天主教 Catholic
- □ 伊斯兰教Muslim
- □ 基督教 Protestant
- □ 没有宗教信仰None
- □ 其他，请注明: Other, specify:_____

8. 您是否在美国有健康保险? Do you have health insurance in U.S.?

- □ 是Yes
- □ 否No
- □ 不知道I don’t know

Appendix H HPV vaccine Information Statement-English Version

HPV Vaccine Gardasil®
What You Need to Know

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1. What is HPV?

Genital **human papillomavirus (HPV)** is the most common sexually transmitted virus in the United States. More than half of sexually active men and women are infected with HPV at some time in their lives.

About 20 million Americans are currently infected, and about 6 million more get infected each year. HPV is usually spread through sexual contact.

Most HPV infections don't cause any symptoms, and go away on their own. But HPV can cause **cervical cancer** in women. Cervical cancer is the 2nd leading cause of cancer deaths among women around the world. In the United States, about 12,000 women get cervical cancer every year and about 4,000 are expected to die from it.

HPV is also associated with several less common cancers, such as vaginal and vulvar cancers in women, and anal and oropharyngeal (back of the throat, including base of tongue and tonsils) cancers in both men and women. HPV can also cause genital warts and warts in the throat.

There is no cure for HPV infection, but some of the problems it causes can be treated.

2. HPV vaccine: Why get vaccinated?

The HPV vaccine you are getting is one of two vaccines that can be given to prevent HPV. It may be given to both males and females.

This vaccine can prevent most cases of cervical cancer in females, if it is given before exposure to the virus.
In addition, it can prevent vaginal and vulvar cancer in females, and genital warts and anal cancer in both males and females.

Protection from HPV vaccine is expected to be long- lasting. But vaccination is not a substitute for cervical cancer screening. Women should still get regular Pap tests.

3.Who should get this HPV vaccine and when?

HPV vaccine is given as a 3-dose series

1st Dose	Now
2nd Dose	1 to 2 months after Dose 1
3rd Dose	6 months after Dose 1

Additional (booster) doses are not recommended.

Routine vaccination

- This HPV vaccine is recommended for girls and boys **11 or 12 years of age**. It *may* be given starting at age 9.

Why is HPV vaccine recommended at 11 or 12 years of age?

HPV infection is easily acquired, even with only one sex partner. That is why it is important to get HPV vaccine before any sexual contact takes place. Also, response to the vaccine is better at this age than at older ages.

Catch-up vaccination

This vaccine is recommended for the following people who have not completed the 3-dose series:

- Females 13 through 26 years of age.
- Males 13 through 21 years of age.

This vaccine *may* be given to men 22 through 26 years of age who have not completed the 3-dose series.

It is *recommended* for men through age 26 who have sex with men or whose immune system is weakened because of HIV infection, other illness, or medications.

HPV vaccine may be given at the same time as other vaccines.

4. Some people should not get HPV vaccine or should wait.

- Anyone who has ever had a life-threatening allergic reaction to any component of HPV vaccine, or to a previous dose of HPV vaccine, should not get the vaccine. Tell your doctor if the person getting vaccinated has any severe allergies, including an allergy to yeast.
- HPV vaccine is not recommended for pregnant women. However, receiving HPV vaccine when pregnant is not a reason to consider terminating the pregnancy. Women who are breast feeding may get the vaccine.
- People who are mildly ill when a dose of HPV vaccine is planned can still be vaccinated. People with a moderate or severe illness should wait until they are better.

5. What are the risks from this vaccine?

This HPV vaccine has been used in the U.S. and around the world for about six years

and has been very safe.

However, any medicine could possibly cause a serious problem, such as a severe allergic reaction. The risk
of any vaccine causing a serious injury, or death, is extremely small.

Life-threatening allergic reactions from vaccines are very rare. If they do occur, it would be within a few minutes to a few hours after the vaccination.

Several **mild** to **moderate** problems are known to occur with this HPV vaccine. These do not last long and go away on their own.

- Reactions in the arm where the shot was given:
  - Pain (about 8 people in 10)
  - Redness or swelling (about 1 person in 4)
- Fever:
  - Mild (100° F) (about 1 person in 10)
  - Moderate (102° F) (about 1 person in 65)
- Other problems:
  - Headache (about 1 person in 3)
- Fainting: Brief fainting spells and related symptoms (such as jerking movements) can happen after any medical procedure, including vaccination. Sitting or lying down for about 15 minutes after a vaccination can help prevent fainting and injuries caused by falls. Tell your doctor if the patient feels dizzy or light- headed, or has vision changes or ringing in the ears.

  Like all vaccines, HPV vaccines will continue to be monitored for unusual or severe problems

6. What if there is a serious reaction?

What should I look for?

- Look for anything that concerns you, such as signs of a severe allergic reaction, very high fever, or behavior changes.

  Signs of a severe allergic reaction can include hives, swelling of the face and throat, difficulty breathing, a fast heartbeat, dizziness, and weakness. These would start a few minutes to a few hours after the vaccination.

What should I do?

- If you think it is a severe allergic reaction or other emergency that can't wait, call 9-1-1 or get the person to the nearest hospital. Otherwise, call your doctor.
- Afterward, the reaction should be reported to the Vaccine Adverse Event Reporting System (VAERS). Your doctor might file this report, or you can do it yourself through the VAERS web site at **www.vaers.hhs.gov**, or by calling **1-800-822-7967**.

VAERS is only for reporting reactions. They do not give medical advice.

7. The National Vaccine Injury Compensation Program

The National Vaccine Injury Compensation Program (VICP) is a federal program that was created to compensate people who may have been injured by certain vaccines.

Persons who believe they may have been injured by a vaccine can learn about the program and about filing a claim by calling **1-800-338-2382**
or visiting the VICP website at
www.hrsa.gov/vaccinecompensation.

8. How can I learn more?

- Ask your doctor.
- Call your local or state health department.
- Contact the Centers for Disease Control and Prevention (CDC):
  - Call **1-800-232-4636** (**1-800-CDC-INFO**) or
  - Visit CDC's website at **www.cdc.gov/vaccines**

Appendix I HPV vaccine Information Statement-Chinese Version

(人
HPVr乳头状瘤病毒）疫苗
Gardasil®
接种须知

1.什么是 HPV?

生殖器人乳头状瘤病毒 **(HPV)** 是美国最常见的
性传播病毒。性生活活跃的男性和女性，一半以 上会不时感染 HPV。
目前美国有将近 2000 万人感染 HPV，并且每年 约有 600 多万人新发感染。HPV 通常通过性接 触传播。
多数 HPV 感染不会出现任何症状，且会自行消 失。但 HPV
可导致女性罹患宫颈癌。宫颈癌是 世界上导致女性死亡的第二大致命癌症。在美国，每年约有 12000 名女性患上宫颈癌，其中 预计约有 4000 名女性因此丧生。
HPV 也与几种较为少见的癌症有关，比如女性
阴道癌和外阴癌，以及男性与女性均可能患上的
肛门癌和口咽（咽后部，包括舌根和扁桃体）癌。此外，HPV
还可引发生殖器疣和喉疣。
HPV 感染无法治愈，但可对其引发的一些问题 进行治疗。

2. HPV 疫苗：为何要接种疫苗?

现有两种可用于预防 HPV 感染的疫苗，您将接
种其中的一种。男性和女性均可接种此疫苗。
倘若女性在接触病毒之前接种此疫苗，则大多数
宫颈癌病例就可预防。此外，此疫苗能够预防女
性阴道癌和外阴癌，以及男性与女性均可能患上 的生殖器疣和肛门癌。
HPV 疫苗的保护作用预计能持续较长时间，但
不可因接种疫苗而放弃宫颈癌筛查。女性仍应定 期接受宫颈抹片检查。

3. 哪些人士应该接种此 HPV疫苗及何时接种？

HPV 疫苗共需接种 ***3*** 剂
第 1 剂 即刻接种
第 2 剂 于第 1 剂后 1 至 2 个月接种
第 3 剂 于第 1 剂后 6 个月接种

建议不做额外（加强）接种。

常规接种

- 建议年满 **11** 或 **12** 岁的男女儿童接种此 HPV 疫苗。9 岁起便可接种此疫苗。

为何建议在 **11** 至 **12** 岁时接种 **HPV** 疫苗？ HPV
极易感染，即使只有一名性伴侣也是如 此。这就是在任何性接触之前接种 HPV 疫苗 非常重要的原因。同时，在该年龄段接种比在
更大年龄段接种对疫苗的反应更佳。

追加接种
建议未完成全 3 剂疫苗接种的下列人士接种此
疫苗：

- 年满 13 至 26 岁的女性。
- 年满 13 至 21 岁的男性。

年满 22 至 26 岁且未完成全 3 剂疫苗接种的男 性也可以接种此疫苗。
建议年龄在 26 岁及以下且与男性有过性行为， 或其免疫系统因 HIV 感染、其他疾病、或药物 治疗而衰弱的男性接种此疫苗。

HPV 疫苗可与其他疫苗同时接种。

4. 部分人士不应接种 HPV 疫苗或应 待到合适时间再接种。

- 曾对 HPV 疫苗的任何成分或在以往接种 HPV 疫苗时产生危及生命的过敏反应的人士， 不应接种此疫苗。如接种者有任何严重过敏情况， 包括对酵母过敏，请告知医生。
- 建议孕妇不要接种 HPV 疫苗。但是，不要因 怀孕时接种过 HPV 疫苗而考虑终止妊娠。哺 乳期的女性可接种此疫苗。
- 在计划接种 HPV 疫苗时患有轻度疾病的人士 仍可接种疫苗。患有中度或重度疾病的人士应 待病情好转后再进行疫苗接种。

5. 接种此疫苗存在哪些风险?

此 HPV 疫苗已在美国和世界各地使用约六年之 久，并且一直都十分安全。
然而，任何药物均有可能造成严重问题，比如严重的过敏反应。因接种任何疫苗而导致严重伤害 或死亡的风险极低。
疫苗所产生危及生命的过敏反应也十分罕见。倘若确实有危及生命的过敏反应，将会在接种疫苗 后几分钟至几小时内出现症状。

现已知接种此 HPV 疫苗会产生若干轻度至中度 问题。这些问题持续时间较短，且会自行消失。

- 手臂接种部位产生的反应：
  - 疼痛（每 10 人中约有 8 例）
  - 红肿（每 4 人中约有 1 例）
- 发烧：
  - 轻度 (100° F)（每 10 人中约有 1 例）
  - 中度 (102° F)（每 65 人中约有 1 例）
- 其他问题：
  - 头痛（每 3 人中约有 1 例）
- 晕眩： 接受任何医疗程序（包括接种疫苗） 后都有可能出现短暂昏厥和相关症状（比如抽 搐）。接种疫苗后静坐或平躺约 15 分钟可有 助于防止晕眩和跌伤。患者如感到头晕目眩、耳鸣眼花，请告知医生。与所有疫苗一样，将 继续对 HPV 疫苗进行监控，以防出现异常或 严重问题。

6. 如果出现严重反应，该怎么办?

我应留意哪些事项？
- 任何异常状况，比如高烧或反常行为。严重过敏反应的迹象包括呼吸困难、声音嘶哑或气喘、荨麻疹、脸色苍白、虚弱、心跳加速或眩晕。

应采取什么措施？
- 立即致电医生，或送医就诊。
- 告知医生发生的情况、发生的日期和时间，以及接种疫苗的时间。
- 要求医生、护士或卫生部门提交疫苗不良事件报告系统 (Vaccine Adverse Event Reporting System, VAERS) 表，报告产生的反应。
  您也可登录 VAERS 网站 **www.vaers.hhs.gov** 或拨打 **1-800-822-7967** 自行提交。

VAERS 并不提供医疗意见。

7. 国家疫苗伤害补偿计划

国家疫苗伤害补偿计划 (National Vaccine Injury Compensation Program, VICP) 是一项旨在为因 接种某些疫苗而遭受伤害的人士提供补偿的联 邦计划。认为自己可能因接种疫苗而受到伤害的人士可 拨打 **1-800-338-2382** 或浏览 VICP 网站 **www.hrsa.gov/vaccinecompensation**，了解该计划的详细内容以及索偿事宜。

8. 如何了解更多信息?

- 咨询医生。
- 致电所在地的当地或州卫生部门。
- 联系疾病控制与预防中心 (Centers for Disease Control and Prevention, CDC)：
  - 拨打 **1-800-232-4636 (1-800-CDC-INFO)** 或
  - 浏览 CDC 网站 **www.cdc.gov/vaccines**

VITA

VITA

Haijuan Gao is currently a doctoral candidate in the field of health promotion and disease prevention. Previously, she received a MD degree from Xi'an Jiaotong University, College of Medicine, China. She was trained as an OB/GYN in the Gynecology & Obstetrics Department at the First Affiliated Hospital of the College of Medicine in Xi'an. Her research focuses on examining cultural influences on reproductive health. Specifically, her current research focuses on cervical cancer prevention and HPV vaccine promotion among minority populations. Her research also examines the impact of globalization on health disparities, HIV/AIDS, health care inequalities.